EPIDEMIOLOGY SURVEILLANCE SYSTEM
1999 REPORT

New Jersey Department of Health and Senior Services
Division of Epidemiology, Environmental and Occupational Health

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Preface

Multiple antibiotic-resistant bacteria have been recognized as a serious threat to the nation's public health since the early 1990s. The tremendous therapeutic advantage afforded by antibiotics is now jeopardized by the increasing resistance of microbes. In an effort to develop a resource to measure antibiotic resistance in New Jersey and to provide a basis for the development of cost-effective measures to reduce further development of antibiotic resistance, the New Jersey Department of Health and Senior Services (NJDHSS) launched an initiative in 1991 to collect information about these organisms. Under this initiative, a statewide hospital laboratory-based **Epidemiology Surveillance System** was established which monitors: 1) methicillin-resistant *Staphylococcus aureus* (MRSA); 2) Gram-positive cocci resistant to vancomycin; 3) penicillin-resistant streptococci / enterococci; 4) Gram-negative rods resistant to imipenem; and 5) Gram-negative rods resistant to amikacin, gentamicin, and tobramycin.

Methodology

A New Jersey **Epidemiology Surveillance Record** form is submitted monthly by each acute-care hospital in New Jersey (Attachment 1). These forms are checked for completeness upon receipt by staff in the NJDHSS Infectious and Zoonotic Diseases Program. Follow-up telephone calls are made as needed to ensure that all forms are submitted each month and that all isolates are sent to the NJDHSS Public Health and Environmental Laboratories.

There are 89 hospitals that participated in the surveillance program in 1999. The overall number of organisms, annual trend, geographic distribution and specific drug-resistant profile in each class of organism were computed. All rates by facility are normalized by each facility's 1999 number of occupied beds, while rates by county are normalized by each county's 1999 resident population. For confidentiality concerns, data from counties containing only one hospital were aggregated with a neighboring county's data in computing rates so that no individual hospital's rate can be identified.

Summary

The data collected by the New Jersey **Epidemiology Surveillance System** between 1992 and 1999 indicated that by 1999 the incidence of vancomycin-resistant enterococci (VRE) had increased more than five-fold since the inception of the system in 1992. Similar trending was reported in the National Nosocomial Infections Surveillance System[1]. The administration of

vancomycin and cephalosporins as well as antianaerobic drugs appears to contribute to the risk of colonization by or infection with VRE[2]. *Enterococcus faecium* isolates accounted for 70.4 percent of the reported 570 VRE isolates in New Jersey in 1999, a 22 percent increase from 1998. High resistance to most available antibiotics within this group of organism has further compounded the problem. *Enterococcus faecalis* accounted for another 17.7 percent of VRE, representing a 26 percent increase from 1998. Compared to the national figure[3], a much higher ampicillin-resistant rate (14.9 percent) is associated with the New Jersey *E. faecalis* isolates. A scheme of drug therapy for clinically important VRE infections was summarized by Dr. Murray in a recent publication[2].

Sterile-site infections with penicillin-resistant *Streptococcus pneumoniae* (PRSP) in New Jersey acute-care hospitals also increased nearly five-fold from 1992 to 1999, parallel to the national trend[4]. A 36 percent increase from the 1998 figure was reported in 1999. The infection pattern appears to be seasonal with a peak in the winter and a trough in the summer. A trend of New Jersey PRSP isolates moving toward resistance to a greater number of drugs is prominent. As suggested by several studies[5,6], inappropriate antibacterial usage in treating respiratory viral infections and unnecessary prescribing of broad spectrum agents are thought to be major factors contributing to this phenomenon. The CDC's Drug-Resistant *S. pneumoniae* Therapeutic Working Group has recently issued new guidelines regarding penicillin minimum inhibitory concentration (MIC) for the definition of PRSP as well as treatment recommendations for outpatients and inpatients with community-acquired pneumonia [7]. A recent study performed by CDC concluded that only a limited number of serotypes are responsible for most infections with PRSP in the United States. The pneumococcal vaccines should offer protection against most drug-resistant strains of *S. pneumoniae*[4].

Although the rates of MRSA declined in New Jersey between 1994 and 1996, this trend has reversed after 1996 with a forty-two percent increase during the 1996-1999 period. Methicillin-resistant *S. aureus* isolates per 100,000 population per year reached 280.5 in 1999, up from 197.8 in 1996. Further investigation is needed to determine whether such a rebound reflects an increase in community-acquired MRSA isolates, as found in Chicago[8]. Unlike nosocomial MRSA isolates, community-acquired isolates from patients without known MRSA risk factors are generally mutidrug susceptible (except to $-lactams) and have distinctive molecular characteristics[9].

The number of amikacin-resistant Gram-negative bacilli has doubled from 1992 to 1999. The most frequently reported organism in 1999 is *Klebsiella pneumoniae* (39.32 percent). An increase in *K. pneumoniae* and *Acinetobacter baumannii* isolates was observed in 1999. The number of imipenem-resistant Gram-negative bacilli has increased sixty percent during these years. A 175 percent increase from the 1998 figure in *Acinetobacter calcoaceticus - A baumannii* complex isolates was found in the 1999 submissions.

MRSA Isolates in New Jersey Hospitals

S. aureus remains the leading organism causing bacteremia in the hospital setting in the United States and Canada[10]. The percentage of methicillin resistance in this organism has increased from 20 to 25 percent in 1990 to 25 to 45 percent in 1997 nationwide[11]. The bar chart in **Exhibit 1** presents the trend of the annual number of MRSA isolates reported during the 1991 to 1999 period in New Jersey. Of the 22,841 MRSA isolates reported in 1999, 32 percent (7,284 isolates) were from wound cultures, 28 percent (6,464 isolates) from sputum cultures, 14 percent (3,282 isolates) from blood cultures, 12 percent (2,698 isolates) from urine cultures and 14 percent (3,113 isolates) from cultures of other body sites. The total number of inpatient isolates was virtually unchanged between 1994 and 1996. However, an increase was observed after 1996. Parallel to this trend, MRSA blood isolates increased sixty-five percent in the 1996-99 period. Despite therapeutic advances, high mortality rates (20 to 40 percent)[12] and incidence of complications (11 to 53 percent)[13] in *S. aureus* bacteremia has been reported. **Exhibit 2** shows the total MRSA isolates per 100,000 population per year from 1991 to 1999. The MRSA rate increased sharply in the years of 1997 (214.67 per 100,000 population), 1998 (237.29 per 100,000 population) and 1999 (280.48 per 100,000 population). **Exhibit 3** displays the number of reported MRSA isolates per 100 occupied beds per month for each facility in 1999. Facilities were ranked by their 1999 rates in descending order. For comparison, the 1998 rates were also included. An obviously increasing trend is observed in the State total, when the average rate in 1999 (11.37) is compared with rates in 1998 (9.50), 1997 (8.11), 1996 (7.06) and 1995 (6.75). Distribution of these isolates and rates by county in descending order is highlighted in **Exhibit 4**. Mercer and Essex Counties had the highest rates of 465.8 and 462.6 per 100,000 population, respectively.

Antibiotic-Resistant Bacteria - Bloodstream Infections in New Jersey Hospitals

A total of 1,053 antibiotic-resistant bacteria isolated from blood cultures were reported in 1999 - a twelve percent increase from 1998 (**Exhibit 5**). This represents a 560 percent increase in the rates during 1991-1999 period (**Exhibit 5**). The frequency of antibiotic-resistant blood isolates in each facility, ranked in descending order by number of isolates per 100 occupied beds, is illustrated in **Exhibit 6**. The average rate in the State reached 7.48 for every 100 occupied beds in 1999, up from 6.24 in 1998; 4.94 in 1997; 3.91 in 1996 and 3.47 in 1995. Distribution of these isolates and the rates by county in descending order is highlighted in **Exhibit 7**. An increasing trend was observed in the State average, by comparing the 1999 rate (12.93) with rates in 1998 (11.55), 1997 (10.8), 1996 (9.1) and 1995 (8.6).

Vancomycin-Resistant Gram-Positive Cocci in New Jersey Hospitals

Enterococci have been documented to be the fourth most prevalent isolates from blood

cultures in United States and Canada[10]. Among them, 69.9 percent represent true bacteremia, 76.9 percent are nosocomial acquired infections, and 13.1 percent are associated with mortality[14]. The occurrence of VRE in the nation has increased from less than 1 percent among all enterococci isolates in 1990 to 6 percent in 1992, 8 percent in 1994, 16 to17 percent in 1996, and 18 percent in 1997[11]. The occurrence of new patterns of resistance in clinical isolates, such as vancomycin intermediate-resistant *S. aureus* (VISA)[15] and *Staphylococcus epidermidis*[16], vancomycin heterogeneous-resistant *S. aureus*[17] and coagulase-negative staphylococci[18], and vancomycin-tolerant *S. pneumoniae*[19] has been documented recently. Because of the increasing concern of VISA strain emergence[20] and the apparent heterogeneity of VISA strains[21], all *S. aureus* isolates with vancomycin MICs of >= 4 µg/ml should be re-confirmed with CDC recommended methods[22]. Methods that would not identify VISA isolates include disk diffusion with no additional method, Microscan^{R} Walkaway Rapid* panels (which provides less than 24 hours incubation), and Vitek systems with a vancomycin MIC of greater than or equal to 8 µg/ml as the indicator for additional testing[22]. Primary testing of *S. aureus* against vancomycin requires 24 hours of incubation time[22]. An MIC susceptibility testing method should be used to confirm vancomycin test results[22].

Exhibit 8 summarizes the variety and number of Gram-positive cocci, collected in New Jersey from 1993 to 1999 that were vancomycin resistant. Vancomycin-resistant enterococci accounts for 99.5 percent of the 573 isolates collected in 1999. The majority of the VRE isolates were *E. faecium* (70.4 percent). *E. faecalis* accounted for another 17.7 percent. In addition, three vancomycin-resistant isolates of *Streptococcus* were reported in 1999. Such isolates should be sent to the NJDHSS laboratory for confirmation. The trend of VRE blood isolates from 1992 to 1999 is presented in **Exhibit 9**. The number of VRE isolates increased more than five-fold during this period, from an average of 9.75 isolates per month in January 1992 to 50.37 isolates per month in December 1999. **Exhibit 10** depicts the frequency of VRE blood isolates in each facility, ranked in descending order by number of isolates per 100 occupied beds. The 1998 rates were also included for comparison. The average State rate per 100,000 population reached 7.0 in 1999, up from 6.3 in 1998; 5.9 in 1997; 5 in 1996; and 4.2 in 1995 (**Exhibit 11**).

Exhibit 12 summarizes the drug resistance profile of VRE, collected from 1993 to 1999. *E. faecium* is the most frequently isolated organism. In 1999, it carried a high level of resistance to penicillin (98 percent), ampicillin (98.2 percent), imipenem (72.9 percent), erythromycin (91.4 percent), ciprofloxacin (99.4 percent), ofloxacin (100 percent), levofloxacin (98.3 percent), travofloxacin (100 percent), high concentration gentamicin (52.8 percent), and high concentration streptomycin (74.3 percent) and trimethoprim/sulfamethoxazole (81.3 percent). An increasing trend of resistance to tetracycline (57.8 percent) and rifampin (48.8 percent) was also observed in the 1999 submissions of *E. faecium*. A complete susceptibility to nitrofurantoin and synercid was observed in *E. faecium* , although the number that were tested was relatively small. In comparison to *E. faecium, E. faecalis* isolates displayed a very different drug resistance pattern to penicillin (28.4 percent), ampicillin (14.9 percent), imipenem (30 percent),

chloramphenicol (33.3 percent), rifampin (0 present), synercid (100 percent) and high concentration gentamicin (92.9 percent). While Willey et al[3] had reported a relationship between ampicillin sensitivity in *E. faecalis* and the usual ampicillin resistance in *E. faecium*, the New Jersey data indicate an unusually high ampicillin-resistant rate in *E. faecalis* isolates. The discrepancy is yet to be explained. However, an accurate identification of VRE at the species level is clearly needed.

Penicillin-Resistant Streptococci / Enterococci in New Jersey Hospitals

S. pneumoniae have been documented to be the sixth most prevalent organism isolated from blood cultures in the United States, while viridans streptococci ranks eleventh[10]. The blood isolates of *S. pneumoniae* represent 100 percent true bacteremia, are mostly community-acquired (91.2 percent), and are associated with a 17.6 percent mortality rate[14]. The national rate of pneumococci resistant to penicillin has increased from 4 percent in 1990 to 7 percent in 1992, 16 percent in 1994, 24 to 27 percent in 1996, and 31 to 42 percent in 1997[11]. **Exhibit 13** lists the variety and the number of penicillin-resistant streptococci and enterococci reported between 1993 and 1999 from New Jersey hospitals. The most frequently reported organism is *E. faecium* (60.6 percent in 1999), followed by *S. pneumoniae* (22.5 percent in 1999). **Exhibit 14** shows an estimated 243 percent increase in the incidence of penicillin-resistant streptococci and enterococci, from 15.49 isolates per month in January 1992 to 37.59 isolates per month in December 1999. The rate and the distribution of these isolates by county are demonstrated in **Exhibit 15**. An increase in the State total rate was observed between 1998 (4.6 per 100,000 population) and 1999 (5.4 per 100,000 population).

Exhibit 16 shows the increasing trend of penicillin-resistant *S. pneumoniae* (PRSP) between December 1991 and February 2000. A substantial increase of 490 percent in PRSP during this period is estimated. The number of PRSP cases fluctuated by season with a peak in the winter (December, January, and February) and a trough in the summer (June, July, and August). **Exhibit 17** displays the rate and the distribution of PRSP by county. Salem county had the highest rate, with 4.65 isolates per 100,000 population. **Exhibit 18** summarizes the drug-resistant profile of PRSP and penicillin-resistant viridans streptococci. Vancomycin is effective against PRSP. However, resistance to ampicillin (66.7 percent), oxacillin (100 percent), cefuroxime (85.7 percent), gentamicin (50 percent), trimethoprim/sulfamethoxazole (81.6 percent), erythromycin (53 percent), and tetracycline (35.9 percent) remains high in 1999 PRSP submissions. For comparison, the reported national rates of resistance among penicillin non-susceptible *S. pneumoniae* are: macrolides 31.8 percent, cefepime 9-12 percent, cefotaxime 6.8-8 percent, and ceftazidime 14 percent[23,24]. They remain susceptible to gatifloxacin and synercid[23]. In penicillin-resistant *S. viridans*, an increasing resistance to cefotaxime / ceftriaxone (83.3 / 87.5 percent) and erythromycin (90 percent) was noted in the 1999 submissions (**Exhibit 18**).

Amikacin-Resistant Gram-Negative Bacilli in New Jersey Hospitals

Gram-negative bacilli are also important pathogens in bloodstream infection. Among them, *Klebsiella* spp. ranked fifth in frequency, *Pseudomonas aeruginosa* ranked seventh, *Proteus mirabilis* ranked tenth, *Acinetobacter* spp. ranked twelfth, *Serratia* spp. ranked thirteenth, *Citrobacter* spp. ranked fourteenth, *Stenotrophomonas maltophilia* ranked fifteenth in a national study[10]. **Exhibit 19** displays the variety and the number of amikacin-resistant Gram-negative bacilli reported from 1993 to 1999 in New Jersey hospitals. The most frequently reported Gram-negative organism in 1999 was *K. pneumoniae* which accounted for 39.3 percent of the total collection. Isolates in *A. baumannii* increased significantly to 15.4 percent in 1999, 10.3 percent in 1998 and 9.4 percent in 1997 from 2.5 percent in 1996. The number of isolates within the *Enterobacteriaceae* family accounted for 49.6 percent of the total collection in 1999, a significant increase from the 28.5 percent in 1998. **Exhibits 20** and **21** illustrate the eight-year trend and the distribution of these isolates by county, respectively. A 216 percent increase, from 4.8 isolates per month in January 1992 to 10.24 isolates per month in December 1999 is demonstrated in **Exhibit 20**. Essex and Mercer counties had the highest rates (4.95 and 4.19 per 100,000 population, respectively), and accounted for 43.6 percent of the isolates reported in the State (**Exhibit 21**).

Imipenem-Resistant Gram-Negative Bacilli in New Jersey Hospitals

Exhibit 22 depicts the number and variety of imipenem-resistant Gram-negative bacilli reported from 1993 to 1999. The total number of organisms in this collection has increased slightly during these years as shown in **Exhibit 23**. *P. aeruginosa* (35.1 percent) is the most frequently reported isolates. *A. baumannii* and *A. calcoaceticus / anitratus* accounted for 23.6 percent of the 1999 submission, a 281 percent increase from 8.4 percent in 1997. **Exhibit 24** depicts the rate and the distribution of these organisms by county. Essex and Hudson counties had the highest rates (5.5 and 5.4 per 100,000 population, respectively) which tripled the State average (1.82 per 100,000 population).

Drug Resistance Profile in Gram-Negative Bacilli in New Jersey Hospitals

Exhibit 25 displays the drug resistance profile in major *Enterobacteriaceae* blood isolates. A high percentage of resistance to penicillins and aminoglycosides, as well as the expanded-spectrum $-lactam antibiotics in *K. pneumoniae*, was observed. Their resistance to amikacin (80.7 percent in 1999), trimethoprim/sulfamethoxazole (85 percent in 1999) and ciprofloxacin (50 percent) has also tended to increase over time. In *Escherichia coli*, an increasing resistance to ceftazidime (71.4 percent), ampicillin (94.1 percent), piperacillin (85.7 percent), tobramycin (75 percent) and trimethoprim/sulfamethoxazole (81.3 percent) in 1999 isolates is evident compared with previous years.

Exhibit 26 demonstrates the drug resistance profile of major Gram-negative bacilli that do not belong to *Enterobacteriaceae*. Imipenem resistance is high in *S. maltophilia* (100 percent), *P. aeruginosa* (86.7 percent), *Burkholderia cepacia* (75 percent), *Flavobacteriumn meningosepticum* (100 percent) and *A. calcoaceticus / anitratus* (62.5 percent) according to the 1999 data. High frequency of aminoglycosides resistance is also observed in *B. cepacia* (100 percent for gentamicin, tobramycin and amikacin) and *A. baumannii* (ranging from 90.3 percent for gentamicin to 60 percent for amikacin). Multiple drug resistance is very common in *S. maltophilia, A. baumannii*, *A. calcoaceticus / anitratus* and *P. aeruginosa*.

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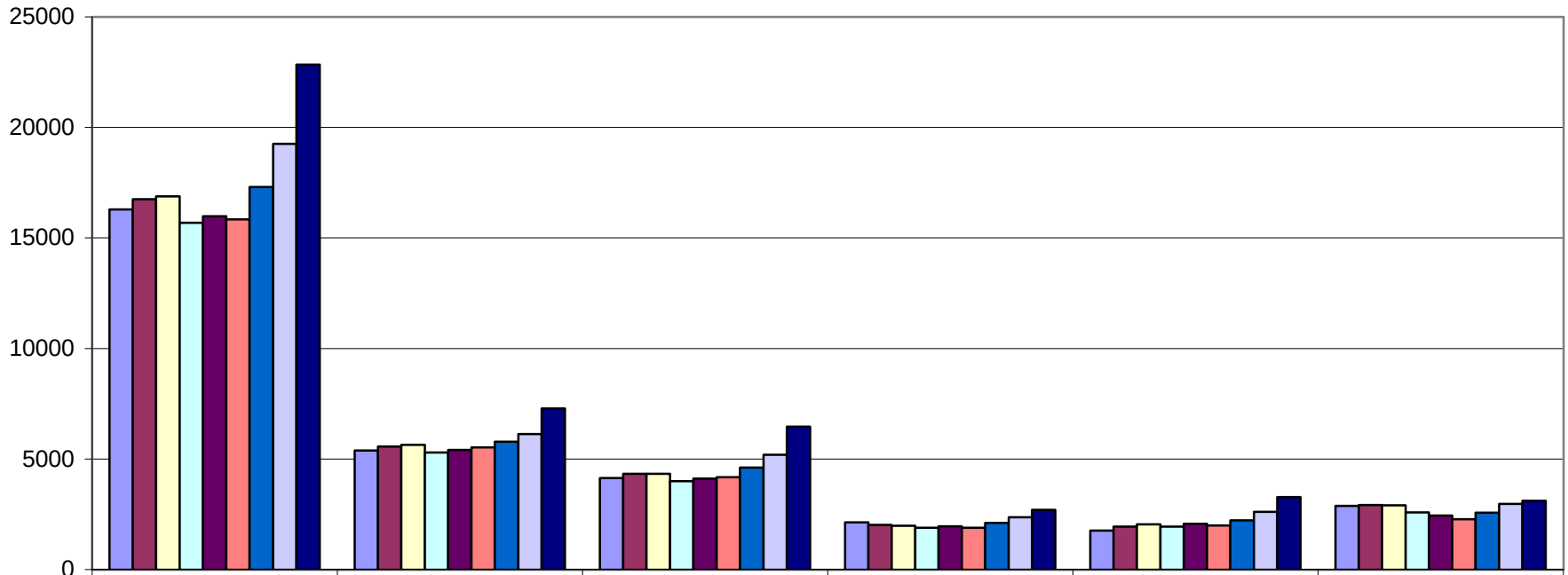
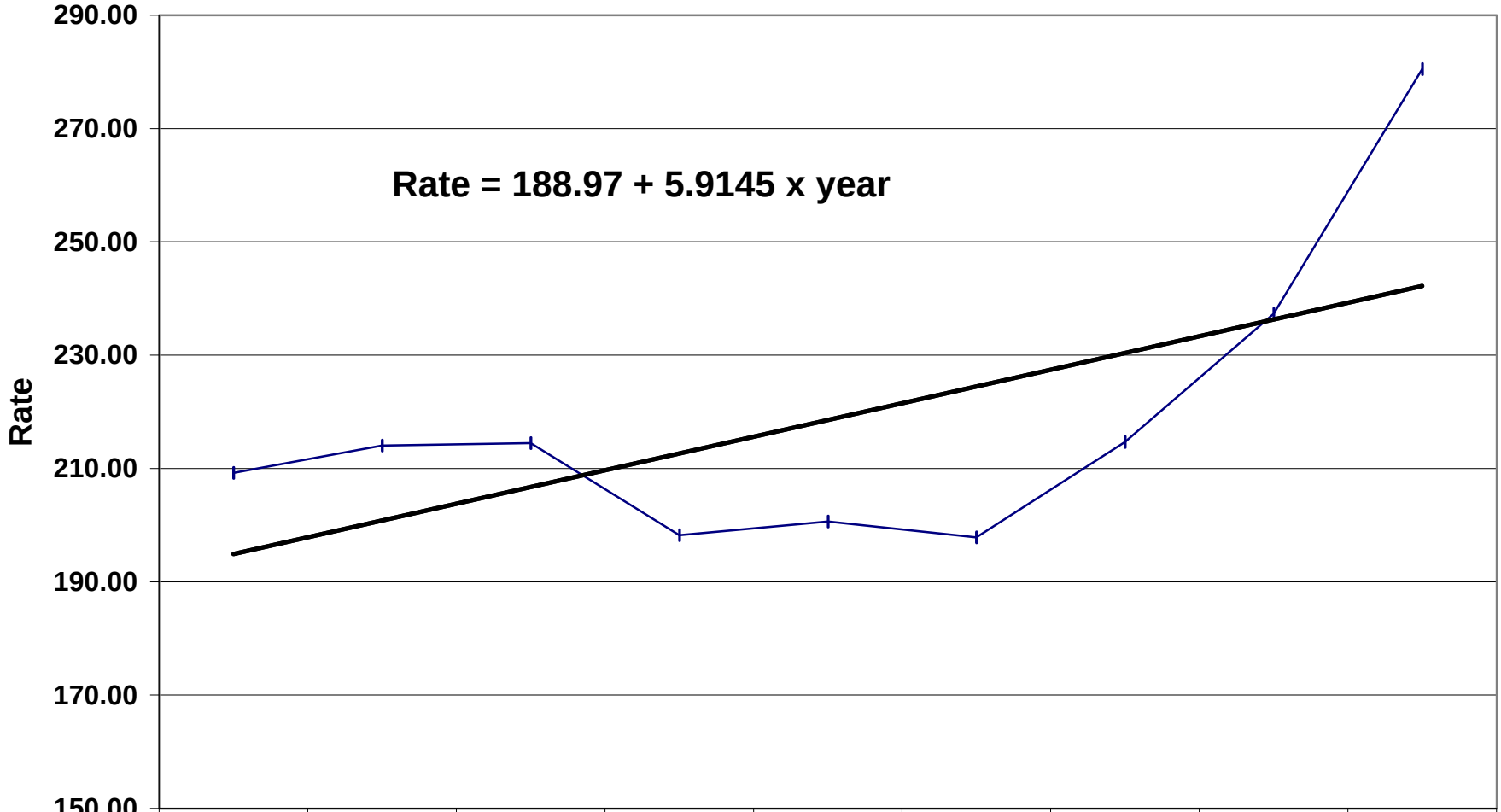
Exhibit 1 : MRSA Isolates by Body Sites, 1991-1999



	Total	Wound	Sputum	Urine	Blood	Other
1991	16286	5388	4136	2128	1759	2875
1992	16750	5559	4324	2013	1944	2910
1993	16885	5635	4331	1978	2041	2900
1994	15691	5290	3997	1884	1935	2585
1995	15977	5407	4107	1952	2074	2437
1996	15842	5520	4176	1889	1986	2271
1997	17299	5780	4610	2113	2222	2574
1998	19256	6132	5188	2363	2609	2964
1999	22841	7284	6464	2698	3282	3113

Exhibit 2 : MRSA Rate by Year (Total Isolates per 100,000 Population)



	1991	1992	1993	1994	1995	1996	1997	1998	1999
Rate	209.2277	214.02321	214.45442	198.21522	200.65924	197.82952	214.67083	237.28865	280.4844

Exhibit 3 : Frequency of MRSA for Each Site, 1999
All Hospitals Ranked (from Highest to Lowest) by MRSA Rate
(Total MRSA Isolates / 100 Occupied Beds / Month)

Rank	Facility code	# Iso. / Month	Rate (1999)	Rate (1998)
1	82*	29.25	47.18	49.39
2	79	44.58	39.00	22.36
3	71	25.42	23.47	22.15
4	119	12.50	21.47	12.02
5	3	35.00	21.13	15.12
6	59	65.83	21.12	14.04
7	54	27.25	20.47	23.61
8	98	20.08	20.13	9.60
9	76	43.17	20.04	19.37
10	55	24.08	19.82	18.01
11	48	30.25	19.00	-
12	46	23.92	17.98	11.98
13	112	72.25	17.39	14.88
14	36	70.50	17.29	13.56
15	66	17.58	17.26	12.46
16	12	23.33	16.51	14.77
17	19*	10.33	16.40	14.16
18	50	42.17	15.92	10.61
19	26*	21.58	15.64	7.97
20	33	57.75	15.23	17.33
21	21	25.92	15.20	8.63
22	116	15.08	14.96	6.74
23	51*	11.92	14.71	10.47
24	25	35.67	14.68	13.31
25	18	12.00	14.10	12.35
26	91	29.33	14.05	12.82
27	52	22.83	13.74	11.34
28	72*	6.67	13.61	14.12
29	56	16.00	13.30	13.86
30	40*	8.50	13.08	17.15
31	43	29.25	12.99	20.03
32	117	24.92	12.91	15.92
33	74	25.00	12.90	5.37
34	109	5.00	12.87	10.07
35	103*	14.33	12.80	6.71
36	108	11.50	12.78	12.95
37	45	14.17	12.21	12.04
38	73	21.08	12.01	12.74
39	97	24.50	11.91	7.04
40	20*	12.50	11.90	10.05
41	95	29.67	11.49	11.22
42	13	39.42	11.46	6.34
43	61*	14.08	11.45	9.23

Rank	Facility code	# Iso. / Month	Rate (1999)	Rate (1998)
44	15	27.50	11.25	9.09
45	28	21.42	11.20	10.60
46	96	18.42	10.94	9.99
47	80	16.33	10.85	10.72
48	42	12.58	10.82	6.30
49	81	57.17	10.77	12.12
50	30***	6.20	10.69	6.61
51	23	19.58	10.57	7.67
52	64*	22.92	10.51	7.22
53	75	7.58	10.47	7.84
54	87	9.92	10.02	6.63
55	47	17.08	9.99	6.03
56	17*	9.08	9.98	6.41
57	102	20.33	9.92	10.17
58	49	24.08	9.81	6.96
59	27	13.50	9.70	7.55
60	67	10.92	9.58	8.65
61	100*	19.83	9.40	7.84
62	77	5.33	9.39	8.96
63	4	52.33	9.36	9.18
64	60	24.50	9.09	12.24
67	88**	33.25	9.06	5.85
65	41	14.08	9.04	11.65
66	35	11.75	8.93	10.38
68	78	13.83	8.38	5.61
69	101	12.25	8.28	9.19
70	44*	6.58	8.13	16.18
71	92	12.25	8.03	6.86
72	31	28.83	7.50	6.16
73	90	25.25	7.47	8.85
74	120*	12.25	7.42	6.73
75	29	4.33	7.33	5.31
76	118*	5.42	7.32	5.78
77	9	19.00	7.16	8.00
78	94	26.00	6.84	6.65
79	57*	8.75	6.48	5.44
80	114	10.67	6.47	4.26
81	8	27.42	6.43	4.39
82	83*	13.25	6.34	2.95
83	38	3.83	5.88	2.76
84	53	22.50	5.20	5.68
85	84	5.33	4.96	3.84
86	86	8.08	4.62	3.58
87	6	7.58	4.20	1.61
88	34	3.83	3.71	2.10
89	62	7.92	2.99	3.78
	State Total	**1833.2**	**11.38**	**9.50**

* Estimated based on the assumption that each facility maintains the same proportion of occupied beds

within the merged hospital group before they were merged.
** 1998 occupied bed number was used for 1999.
*** Based on January to May, 1999 data.
Note : Rate = number of MRSA isolates per 100 occupied beds per month.

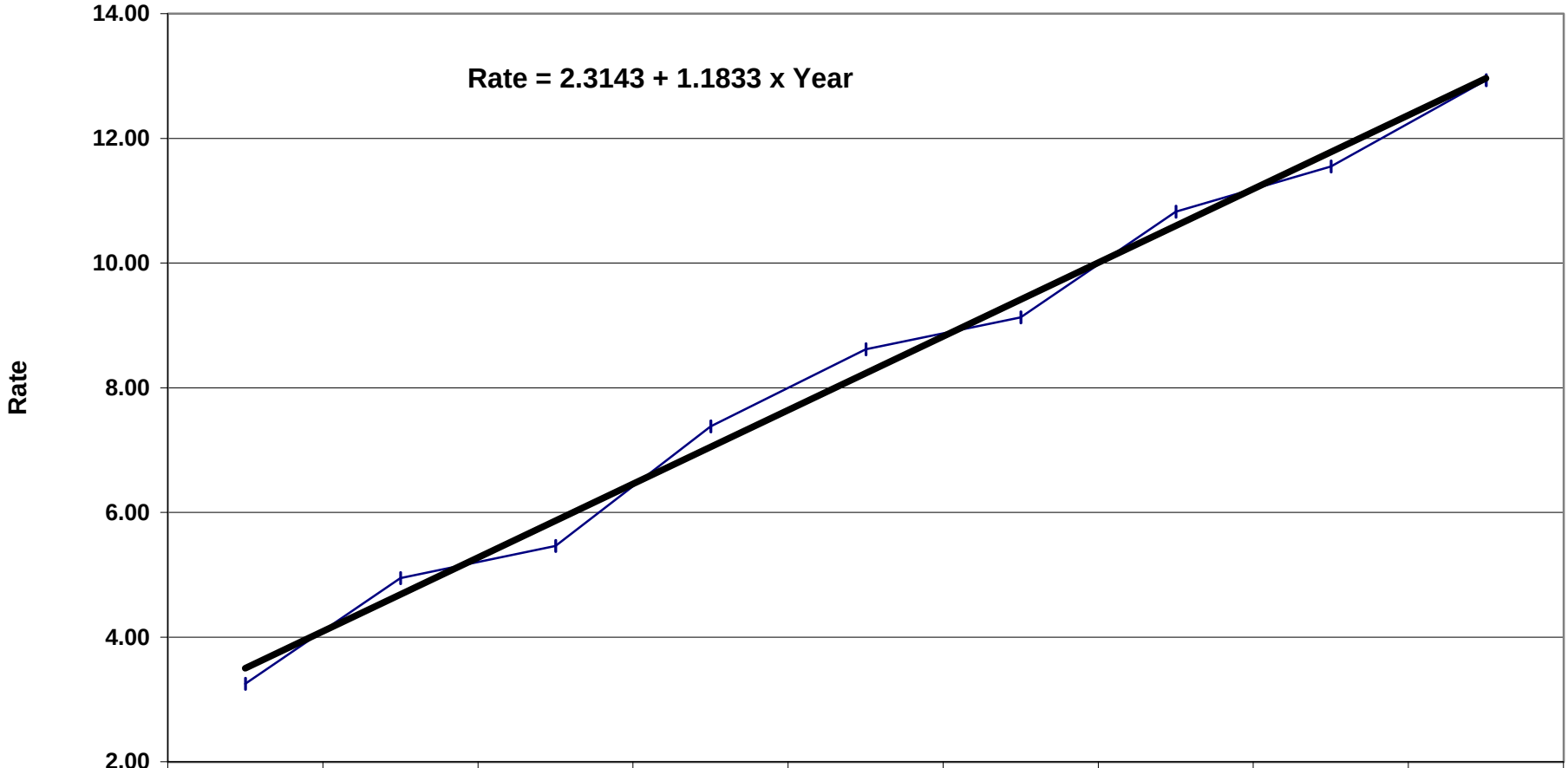
Exhibit 4 : Number of Total MRSA Isolates by County, 1999
In Descending Order of Number of Isolates per 100,000 Population

County	Num. Isolates	Percentage	Isolates / 100,000 Population
Mercer	1555	6.81%	465.76
Essex	3457	15.14%	462.56
Union	1807	7.91%	362.30
Atlantic - Cape May*	1172	5.13%	347.12
Middlesex	2418	10.59%	336.79
Morris	1466	6.42%	316.26
Cumberland	434	1.90%	309.75
Ocean	1537	6.73%	308.92
Bergen	2200	9.63%	256.69
Camden	1269	5.56%	252.24
Hudson	1221	5.35%	220.87
Passaic	1013	4.44%	208.84
Monmouth	1269	5.56%	207.54
Sussex - Warren*	486	2.13%	198.36
Salem	106	0.46%	164.25
Burlington	667	2.92%	157.12
Gloucester	339	1.48%	135.33
Hunterdon - Somerset*	425	1.86%	102.99
State Total	**22841**	**100.00%**	**280.48**

Rate = Number of isolates per 100,000 resident population in each county.

* Data for these two neighboring counties were aggregated according to guidelines of confidentiality disclosure.

Exhibit 5 : Rate of Antibiotic-Resistant Blood Isolates by Year (Total Isolates per 100,000 Population)



	Year 1991 # Iso. 253	Year 1992 # Iso. 387	Year 1993 # Iso. 430	Year 1994 # Iso. 584	Year 1995 # Iso. 686	Year 1996 # Iso. 731	Year 1997 # Iso. 872	Year 1998 # Iso. 937	Year 1999 # Iso. 1053
Rate	3.25031373	4.94489445	5.46137992	7.3773301	8.61564971	9.12847992	10.8210281	11.5465031	12.9306978

Exhibit 6 : Frequency of Antibiotic Resistant Blood Isolates for Each Hospital, 1999
In Descending Order of Number of Isolates per 100 Occupied Beds

Rank	Fac. Code	Num. Isolates	Percentage	Rate (1999)	Rate (1998)
1	59	98	9.31%	31.44	34.38
2	62	59	5.60%	22.29	14.10
3	48	33	3.13%	20.72	-
4	117	36	3.42%	18.65	10.61
5	73	31	2.94%	17.65	11.76
6	81	93	8.83%	17.52	15.53
7	82*	10	0.95%	16.13	9.95
8	100*	31	2.94%	14.69	16.21
9	112	60	5.70%	14.44	17.88
10	54	18	1.71%	13.52	4.25
11	56	16	1.52%	13.30	13.61
12	60	33	3.13%	12.24	12.32
13	29	6	0.57%	10.15	1.77
14	64*	21	1.99%	9.63	8.71
15	50	25	2.37%	9.44	5.93
16	36	38	3.61%	9.32	4.42
17	66	9	0.85%	8.83	4.18
18	44*	7	0.66%	8.64	9.30
19	46	11	1.04%	8.27	1.44
20	61*	10	0.95%	8.13	3.87
21	116	8	0.76%	7.93	0.00
22	38	5	0.47%	7.67	1.38
23	8	30	2.85%	7.04	2.65
24	43	15	1.42%	6.66	34.62
25	33	25	2.37%	6.59	6.51
26	88**	23	2.18%	6.27	7.35
27	91	13	1.23%	6.23	4.15
28	67	7	0.66%	6.14	18.80
29	87	6	0.57%	6.06	3.74
30	45	7	0.66%	6.03	3.68
31	52	10	0.95%	6.02	4.39
32	98	6	0.57%	6.01	3.96
33	23	11	1.04%	5.94	3.79
34	17*	5	0.47%	5.49	6.32
35	4	30	2.85%	5.36	3.02
36	97	11	1.04%	5.35	6.69
37	83*	11	1.04%	5.26	0.00
38	109	2	0.19%	5.15	30.76
39	15	12	1.14%	4.91	5.47
40	28	9	0.85%	4.71	6.21
41	31	18	1.71%	4.68	1.89
42	76	10	0.95%	4.64	5.31
43	41	7	0.66%	4.49	3.79
44	75	3	0.28%	4.14	0.77

Rank	Fac. Code	Num. Isolates	Percentage	Rate (1999)	Rate (1998)
45	72*	2	0.19%	4.08	3.89
46	95	10	0.95%	3.87	2.42
47	84	4	0.38%	3.72	2.66
48	51*	3	0.28%	3.70	6.47
49	53	16	1.52%	3.70	7.02
50	12	5	0.47%	3.54	4.09
51	108	3	0.28%	3.33	6.66
52	92	5	0.47%	3.28	6.38
53	49	8	0.76%	3.26	1.67
54	90	11	1.04%	3.25	0.60
55	102	6	0.57%	2.93	2.05
56	25	7	0.66%	2.88	2.27
57	20*	3	0.28%	2.86	0.91
58	118*	2	0.19%	2.70	1.28
59	74	5	0.47%	2.58	2.54
60	42	3	0.28%	2.58	3.11
61	3	4	0.38%	2.42	1.83
62	94	9	0.85%	2.37	3.57
63	103*	2	0.19%	1.79	12.17
64	79	2	0.19%	1.75	4.09
65	119	1	0.09%	1.72	17.82
66	19*	1	0.09%	1.59	9.77
67	26*	2	0.19%	1.45	1.34
68	27	2	0.19%	1.44	0.00
69	78	2	0.19%	1.21	0.90
70	34	1	0.09%	0.97	0.00
71	71	1	0.09%	0.92	1.02
72	101	1	0.09%	0.68	0.00
73	114	1	0.09%	0.61	0.00
74	96	1	0.09%	0.59	2.80
75	30***	1	0.09%	0.34	1.72
Total		**1053**	**100.00%**	**7.48**	**6.24**

* Estimated based on the assumption that each facility maintains the same proportion of occupied beds within the merged hospital group before they were merged.
** 1998 occupied bed number was used for 1999.
*** Based on January to May, 1999 data.
Note : Rate = number of isolates per 100 occupied beds per year.

Exhibit 7 : Number of Antibiotic Resistant Blood Isolates by County, 1999
In Descending Order of Number of Isolates per 100,000 Population

County	Num. Isolates	Percentage	Isolates / 100,000 Population
Essex	264	0.25	35.32
Middlesex	192	0.18	26.74
Hudson	94	0.09	17.00
Union	74	0.07	14.84
Camden	71	0.07	14.11
Mercer	43	0.04	12.88
Salem	7	0.01	10.85
Bergen	81	0.08	9.45
Morris	39	0.04	8.41
Ocean	41	0.04	8.24
Passaic	39	0.04	8.04
Warren - Sussex *	14	0.01	5.71
Monmouth	31	0.03	5.07
Gloucester	12	0.01	4.79
Burlington	20	0.02	4.71
Hunterdon - Somerset *	18	0.02	4.36
Cumberland	6	0.01	4.28
Atlantic - Cape May *	7	0.01	2.07
Total	**1053**	**1.00**	**12.93**

Rate = Number of isolates per 100,000 resident population in each county.

* Data for these two neighboring counties were aggregated according to guidelines of confidentiality disclosure.

Exhibit 8 : Vancomycin Resistant Gram Positive Cocci Isolated from Blood Cultures, 1993-1999

	1993		1994		1995		1996		1997		1998		1999	
Organism Name	**Frequency**		**Frequency**		**Frequency**		**Frequency**		**Frequency**		**Frequency**		**Frequency**	
VRE	**210**	**95.02%**	**298**	**97.70%**	**337**	**97.40%**	**404**	**97.12%**	**477**	**98.75%**	**510**	**97.51%**	**570**	**99.48%**
Enterococcus faecium	125	56.56%	231	75.74%	254	73.41%	296	71.15%	333	69.38%	329	62.91%	401	69.98%
Enterococcus faecalis	40	18.10%	31	10.16%	30	8.67%	36	8.65%	48	10.00%	80	15.30%	101	17.63%
Enterococcus spp.	41	18.55%	30	9.84%	43	12.43%	63	15.14%	73	15.21%	84	16.06%	54	9.42%
Enterococcus avium	2	0.90%	2	0.66%	2	0.58%	3	0.72%	5	1.04%	4	0.76%	1	0.17%
Enterococcus durans	2	0.90%	4	1.31%	7	2.02%	6	1.44%	2	0.42%	2	0.38%	1	0.17%
Enterococcus raffinosus	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	3	0.52%
Enterococcus gallinarium	0	0.00%	0	0.00%	1	0.29%	0	0.00%	10	2.08%	9	1.72%	8	1.40%
Enterococcus casseliflavus	0	0.00%	0	0.00%	0	0.00%	0	0.00%	3	0.63%	2	0.38%	1	0.17%
Streptococcus pneumoniae	0	0.00%	0	0.00%	1	0.29%	1	0.24%	1	0.21%	0	0.00%	1	0.17%
Viridans streptococci	4	1.81%	1	0.33%	3	0.87%	5	1.20%	2	0.42%	0	0.00%	0	0.00%
Streptococcus mitis	1	0.45%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Streptococcus bovis	1	0.45%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Streptococcus equinus	0	0.00%	0	0.00%	2	0.58%	0	0.00%	0	0.00%	0	0.00%	1	0.17%
Streptococcus spp.	1	0.45%	1	0.33%	0	0.00%	1	0.24%	1	0.21%	2	0.38%	1	0.17%
Staphylococcus aureus	0	0.00%	0	0.00%	0	0.00%	2	0.48%	0	0.00%	1	0.19%	0	0.00%
Staphylococcus saprophyticus	1	0.45%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Staphylococcus auricularis	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.19%	0	0.00%
Staphylococcus coag. neg.	1	0.45%	4	1.31%	1	0.29%	0	0.00%	0	0.00%	1	0.19%	0	0.00%
Micrococcus spp.	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	4	0.76%	0	0.00%
Leuconostoc spp.	2	0.90%	1	0.33%	1	0.29%	2	0.48%	0	0.00%	2	0.38%	0	0.00%
Pediococcus spp.	0	0.00%	0	0.00%	1	0.29%	1	0.24%	2	0.42%	2	0.38%	0	0.00%
Total	**221**	**100.00%**	**305**	**100.00%**	**346**	**100.00%**	**416**	**100.00%**	**480**	**100.00%**	**523**	**100.00%**	**573**	**100.00%**

Exhibit 9 : Trend of Vancomycin-Resistant Enterococci Blood Isolates, 1992-1999

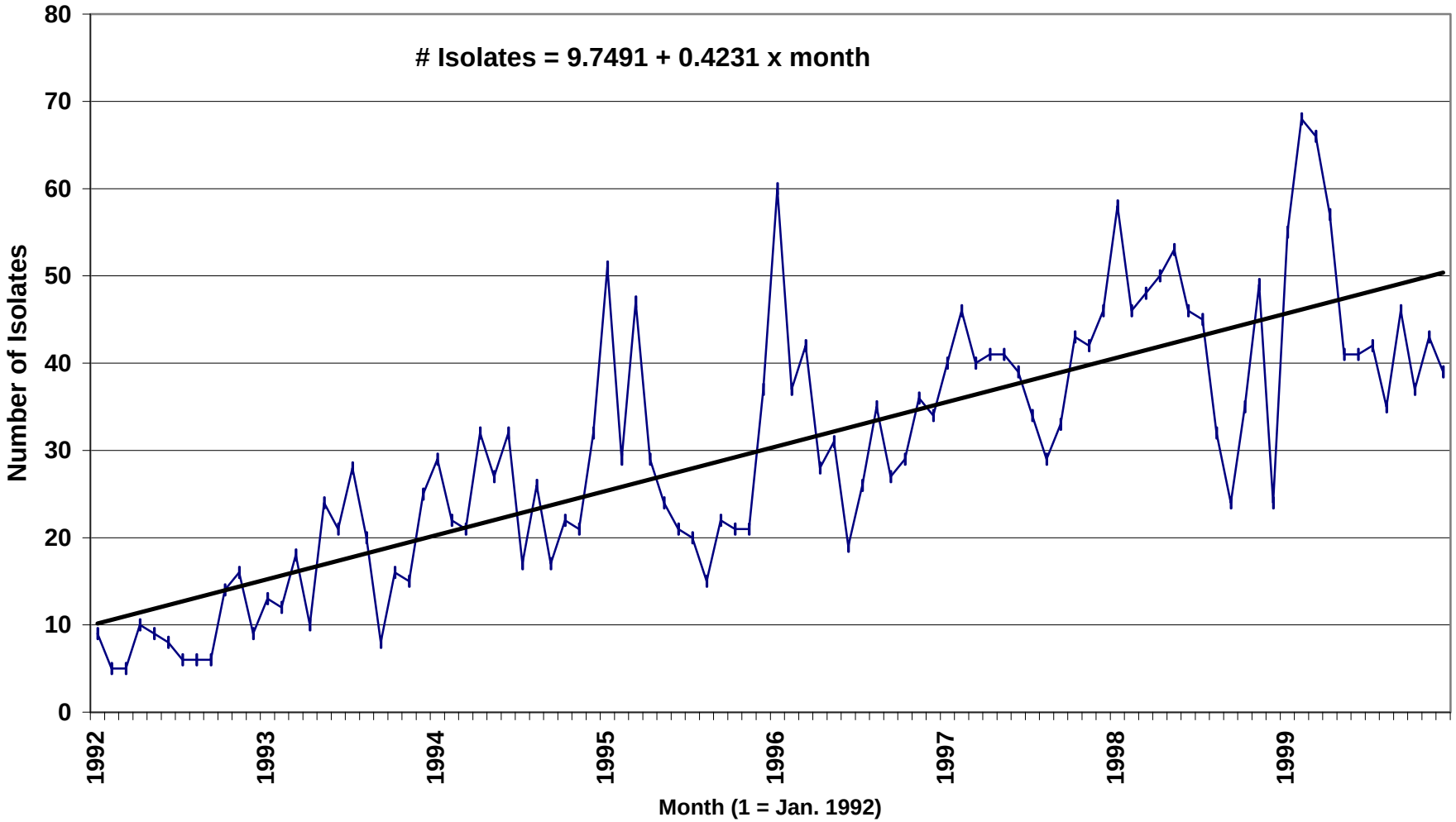


Exhibit 10 : Frequency of Vancomycin-Resistant Enterococci by Facility, 1999
All Hospitals Ranked (from Highest to Lowest) by Vancomycin-Resistant Enterococci Rate
(Total Blood Isolates / 100 Occupied Beds)

Rank	Fac. Code	Num. Isolates	Percentage	Rate (1999)	Rate (1998)
1	117	30	5.26%	15.55	7.72
2	48	24	4.21%	15.07	-
3	82*	9	1.58%	14.52	5.69
4	112	60	10.53%	14.44	16.35
5	59	37	6.49%	11.87	10.45
6	60	27	4.74%	10.02	9.51
7	100*	21	3.68%	9.95	10.36
8	73	16	2.81%	9.11	6.41
9	50	21	3.68%	7.93	3.56
10	46	10	1.75%	7.52	0.72
11	81	39	6.84%	7.35	6.90
12	43	13	2.28%	5.77	31.73
13	88**	21	3.68%	5.72	7.35
14	29	3	0.53%	5.07	1.77
15	66	5	0.88%	4.91	3.14
16	61*	6	1.05%	4.88	3.87
17	38	3	0.53%	4.60	1.38
18	28	8	1.40%	4.18	3.10
19	76	9	1.58%	4.18	1.33
20	62	10	1.75%	3.78	1.14
21	54	5	0.88%	3.76	0.00
22	4	20	3.51%	3.58	2.42
23	91	7	1.23%	3.35	4.15
24	17*	3	0.53%	3.30	2.11
25	8	14	2.46%	3.29	2.41
26	90	11	1.93%	3.25	0.60
27	95	8	1.40%	3.10	1.21
28	98	3	0.53%	3.01	0.00
29	116	3	0.53%	2.98	0.00
30	20*	3	0.53%	2.86	0.91
31	53	12	2.11%	2.77	2.81
32	64*	6	1.05%	2.75	3.39
33	67	3	0.53%	2.63	16.11
34	92	4	0.70%	2.62	5.74
35	45	3	0.53%	2.59	1.84
36	109	1	0.18%	2.57	26.36
37	41	4	0.70%	2.57	3.16
38	25	6	1.05%	2.47	0.45
39	44*	2	0.35%	2.47	1.16
40	51*	2	0.35%	2.47	1.29
41	15	6	1.05%	2.46	1.68
42	36	10	1.75%	2.45	1.26
43	102	5	0.88%	2.44	0.51

Rank	Fac. Code	Num. Isolates	Percentage	Rate (1999)	Rate (1998)
44	52	4	0.70%	2.41	0.63
45	23	4	0.70%	2.16	0.00
46	12	3	0.53%	2.13	2.04
47	74	4	0.70%	2.06	1.59
48	87	2	0.35%	2.02	0.94
49	33	7	1.23%	1.85	1.70
50	103*	2	0.35%	1.79	10.30
51	79	2	0.35%	1.75	4.09
52	56	2	0.35%	1.66	3.02
53	49	4	0.70%	1.63	1.25
54	19*	1	0.18%	1.59	5.86
55	26*	2	0.35%	1.45	1.34
56	27	2	0.35%	1.44	0.00
57	75	1	0.18%	1.38	0.00
58	31	5	0.88%	1.30	0.54
59	3	2	0.35%	1.21	1.22
60	108	1	0.18%	1.11	2.22
61	34	1	0.18%	0.97	0.00
62	83*	2	0.35%	0.96	0.00
63	84	1	0.18%	0.93	0.89
64	71	1	0.18%	0.92	0.00
65	42	1	0.18%	0.86	3.11
66	94	2	0.35%	0.53	0.55
67	97	1	0.18%	0.49	1.91
	State Total	**570**	**100.00%**	**4.32**	**3.71**

* Estimated based on the assumption that each facility maintains the same proportion of occupied beds within the merged hospital group before they were merged.

** 1998 occupied bed number was used for 1999.

Note : Rate = number of isolates per 100 occupied beds per year.

Exhibit 11 : Number and Rate of Vancomycin-Resistant Enterococci Blood Isolates by County, 1999
In Descending Order of Number of Isolates per 100,000 Population

County	Num. Isolates	Percentage	Isolates / 100,000 Population
Essex	143	25.09%	19.13
Middlesex	107	18.77%	14.90
Union	58	10.18%	11.63
Camden	46	8.07%	9.14
Mercer	27	4.74%	8.09
Salem	4	0.70%	6.20
Bergen	50	8.77%	5.83
Hudson	27	4.74%	4.88
Ocean	21	3.68%	4.22
Burlington	16	2.81%	3.77
Monmouth	22	3.86%	3.60
Passaic	17	2.98%	3.50
Cumberland	4	0.70%	2.85
Sussex - Warren *	6	1.05%	2.45
Morris	10	1.75%	2.16
Gloucester	4	0.70%	1.60
Atlantic - Cape May *	4	0.70%	1.18
Hunterdon - Somerset *	4	0.70%	0.97
State Total	**570**	**100.00%**	**7.00**

Rate = Number of isolates per 100,000 resident population in each county.

* Data for these two neighboring counties were aggregated according to guidelines of confidentiality disclosure.

Exhibit 12 : Drug Resistance Profile in Vancomycin-Resistant Enterococci Blood Isolates, 1993-1999

Antibiotic	Year / Organism	1993 %R	1993 n	1994 %R	1994 n	1995 %R	1995 n	1996 %R	1996 n	1997 %R	1997 n	1998 %R	1998 n	1999 %R	1999 n
Penicillin	*E. faecium*	97.80%	91	98.41%	189	97.81%	183	99.10%	221	98.07%	207	95.71%	210	98.00%	250
	E. faecalis	33.33%	18	45.00%	20	42.11%	19	18.18%	22	35.48%	31	25.00%	40	28.36%	67
	E. spp.	76.67%	30	90.48%	21	84.21%	19	100.00%	36	94.23%	52	91.49%	47	90.00%	20
Ampicilin	*E. faecium*	98.23%	113	95.37%	216	96.19%	236	87.76%	286	97.48%	318	96.90%	323	98.24%	397
	E. faecalis	38.89%	36	29.03%	31	34.48%	29	14.29%	35	24.44%	45	15.58%	77	14.85%	101
	E. spp.	78.95%	38	85.71%	28	86.05%	43	93.33%	60	95.31%	64	87.84%	74	91.84%	49
Imipenem	*E. faecium*	81.82%	44	98.61%	72	87.50%	72	90.80%	87	86.59%	82	75.36%	89	72.86%	70
	E. faecalis	20.00%	10	42.86%	7	40.00%	5	0.00%	5	0.00%	7	0.00%	8	30.00%	10
	E. spp.	71.43%	7	80.00%	5	87.50%	8	77.78%	9	80.00%	5	66.67%	6	0.00%	2
Streptomycin 2000	*E. faecium*	-	-	-	-	100.00%	2	88.46%	26	88.52%	61	77.36%	53	74.34%	113
	E. faecalis	-	-	-	-	-	-	66.66%	6	87.50%	6	80.00%	5	80.85%	47
	E. spp.	-	-	-	-	-	-	50.00%	4	77.78%	9	90.00%	10	80.00%	10
Getamicin 500	*E. faecium*	-	-	-	-	100.00%	3	88.46%	26	73.77%	61	58.90%	73	52.76%	163
	E. faecalis	-	-	-	-	-	-	100.00%	2	100.00%	7	100.00%	5	92.86%	56
	E. spp.	-	-	-	-	-	-	100.00%	8	72.73%	11	55.00%	20	89.47%	19
Erythromycin	*E. faecium*	95.12%	41	95.24%	84	97.53%	81	96.19%	105	94.94%	79	92.22%	90	91.38%	116
	E. faecalis	93.33%	15	90.00%	10	83.33%	6	100.00%	5	77.78%	9	85.71%	14	95.83%	24
	E. spp.	75.00%	8	100.00%	8	90.91%	11	100.00%	13	90.48%	21	88.89%	9	100.00%	5
Ciprofloxacin	*E. faecium*	75.93%	54	91.67%	96	98.63%	73	97.62%	126	98.08%	104	98.21%	112	99.40%	168
	E. faecalis	20.00%	10	100.00%	11	100.00%	10	100.00%	9	87.50%	16	96.15%	26	88.24%	51
	E. spp.	100.00%	8	100.00%	4	100.00%	3	83.33%	12	93.55%	31	96.43%	28	100.00%	13
Ofloxacin	*E. faecium*	-	-	100.00%	7	93.33%	15	94.87%	39	100.00%	36	100.00%	23	100.00%	6
	E. faecalis	-	-	100.00%	1	100.00%	1	-	-	85.71%	7	100.00%	5	100.00%	1
	E. spp.	-	-	100.00%	5	100.00%	10	88.89%	9	85.71%	7	100.00%	1	-	-
Levofloxacin	*E. faecium*	-	-	-	-	-	-	-	-	-	-	-	-	98.28%	58
	E. faecalis	-	-	-	-	-	-	-	-	-	-	-	-	81.82%	11
	E. spp.	-	-	-	-	-	-	-	-	-	-	-	-	100.00%	9

Antibiotic	Year / Organism	1993 %R	1993 n	1994 %R	1994 n	1995 %R	1995 n	1996 %R	1996 n	1997 %R	1997 n	1998 %R	1998 n	1999 %R	1999 n
	E. faecium	-	-	-	-	-	-	-	-	-	-	-	-	100.00%	6
Travofloxacin	***E. faecalis***	-	-	-	-	-	-	-	-	-	-	-	-	0.00%	2
	***E.* spp.**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E. faecium	0.00%	36	1.89%	53	2.53%	79	8.60%	93	1.36%	147	0.66%	151	1.09%	183
Chloramphenicol	***E. faecalis***	0.00%	6	40.00%	5	0.00%	3	50.00%	2	44.44%	9	33.33%	18	33.33%	33
	***E.* spp.**	0.00%	3	0.00%	7	0.00%	7	16.67%	12	10.00%	20	0.00%	21	5.56%	18
	E. faecium	25.00%	72	40.25%	159	41.57%	166	36.79%	212	48.04%	204	54.42%	215	57.77%	251
Tetracycline	***E. faecalis***	66.67%	18	68.42%	19	31.82%	22	33.33%	15	56.00%	25	40.54%	37	58.21%	67
	***E.* spp.**	31.43%	35	40.00%	25	52.78%	36	39.29%	56	60.00%	60	54.39%	57	67.65%	34
	E. faecium	41.18%	17	67.44%	43	42.31%	26	59.09%	22	62.50%	16	83.33%	6	81.25%	16
Trimethoprim/	***E. faecalis***	66.67%	3	25.00%	8	33.33%	3	-	-	25.00%	4	66.67%	3	100.00%	1
Sulfamethoxazole	***E.* spp.**	50.00%	2	50.00%	2	50.00%	6	70.00%	10	75.00%	8	50.00%	2	-	-
	E. faecium	92.00%	25	46.67%	30	45.45%	22	39.29%	28	33.33%	42	44.74%	38	48.78%	41
Rifampin	***E. faecalis***	100.00%	1	50.00%	2	-	-	0.00%	3	25.00%	4	40.00%	5	0.00%	6
	***E.* spp.**	-	-	50.00%	2	66.67%	3	28.57%	7	0.00%	6	33.33%	3	0.00%	1
	E. faecium	100.00%	1	20.00%	10	5.88%	17	0.00%	10	6.25%	16	0.00%	13	0.00%	19
Nitrofurantoin	***E. faecalis***	-	-	0.00%	1	0.00%	4	0.00%	5	0.00%	3	0.00%	5	0.00%	14
	***E.* spp.**	40.00%	5	0.00%	7	11.11%	9	0.00%	3	10.53%	19	4.35%	23	0.00%	2
	E. faecium	-	-	-	-	-	-	-	-	-	-	-	-	0.00%	4
Synercid	***E. faecalis***	-	-	-	-	-	-	-	-	-	-	-	-	100.00%	1
	***E.* spp.**	-	-	-	-	-	-	-	-	-	-	-	-	-	-

n = Number of isolates tested for the specific antibiotic.

Exhibit 13 : Penicillin-Resistant Streptococci / Enterococci Blood Isolates, 1993-1999

	1993		1994		1995		1996		1997		1998		1999	
Organism Name	**Frequency**		**Frequency**		**Frequency**		**Frequency**		**Frequency**		**Frequency**		**Frequency**	
Enterococcus faecium	113	60.43%	194	63.82%	188	60.06%	228	63.69%	210	53.03%	216	57.45%	264	60.55%
Enterococcus faecalis	9	4.81%	9	2.96%	10	3.19%	4	1.12%	14	3.54%	14	3.72%	28	6.42%
Enterococcus durans	2	1.07%	4	1.32%	4	1.28%	5	1.40%	1	0.25%	0	0.00%	1	0.23%
Enterococcus gallinarium	0	0.00%	0	0.00%	1	0.32%	0	0.00%	10	2.53%	7	1.86%	6	1.38%
Enterococcus avium	1	0.53%	1	0.33%	2	0.64%	2	0.56%	4	1.01%	1	0.27%	3	0.69%
Enterococcus casseliflavus	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.25%	1	0.27%	1	0.23%
Enterococcus raffinosus	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.23%
Enterococcus spp.	23	12.30%	22	7.24%	17	5.43%	38	10.61%	55	13.89%	47	12.50%	21	4.82%
Streptococcus pneumoniae	**27**	**14.44%**	**62**	**20.39%**	**83**	**26.52%**	**67**	**18.72%**	**81**	**20.45%**	**72**	**19.15%**	**98**	**22.48%**
Viridans streptococci	2	1.07%	4	1.32%	2	0.64%	8	2.23%	14	3.54%	9	2.39%	10	2.29%
Streptococcus bovis	0	0.00%	1	0.33%	0	0.00%	0	0.00%	1	0.25%	0	0.00%	0	0.00%
Streptococcus equinus	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.27%	0	0.00%
Streptococcus mutans	0	0.00%	0	0.00%	1	0.32%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Streptococcus salivarius	1	0.53%	0	0.00%	0	0.00%	0	0.00%	1	0.25%	0	0.00%	1	0.23%
Streptococcus mitis	3	1.60%	4	1.32%	2	0.64%	2	0.56%	2	0.51%	2	0.53%	0	0.00%
Streptococcus sanguis	1	0.53%	1	0.33%	0	0.00%	1	0.28%	0	0.00%	1	0.27%	0	0.00%
Streptococcus crista	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.23%
Streptococcus intermedius	3	1.60%	0	0.00%	1	0.32%	0	0.00%	2	0.51%	2	0.53%	0	0.00%
Streptococcus acidominimus	1	0.53%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Streptococcus pyogenes	0	0.00%	1	0.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Streptococcus agalactiae	1	0.53%	0	0.00%	1	0.32%	0	0.00%	0	0.00%	1	0.27%	0	0.00%
Streptococcus not Group D	0	0.00%	0	0.00%	0	0.00%	1	0.28%	0	0.00%	0	0.00%	0	0.00%
alpha *Streptococcus*	0	0.00%	0	0.00%	1	0.32%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Streptococcus spp.	0	0.00%	1	0.33%	0	0.00%	2	0.56%	0	0.00%	2	0.53%	1	0.23%
State Total	**187**	**100%**	**304**	**100%**	**313**	**100%**	**358**	**100%**	**396**	**100%**	**376**	**100%**	**436**	**100%**

Exhibit 14 : Trend of Penicillin-Resistant Streptococci / Enterococci Blood Isolates, 1992-1999

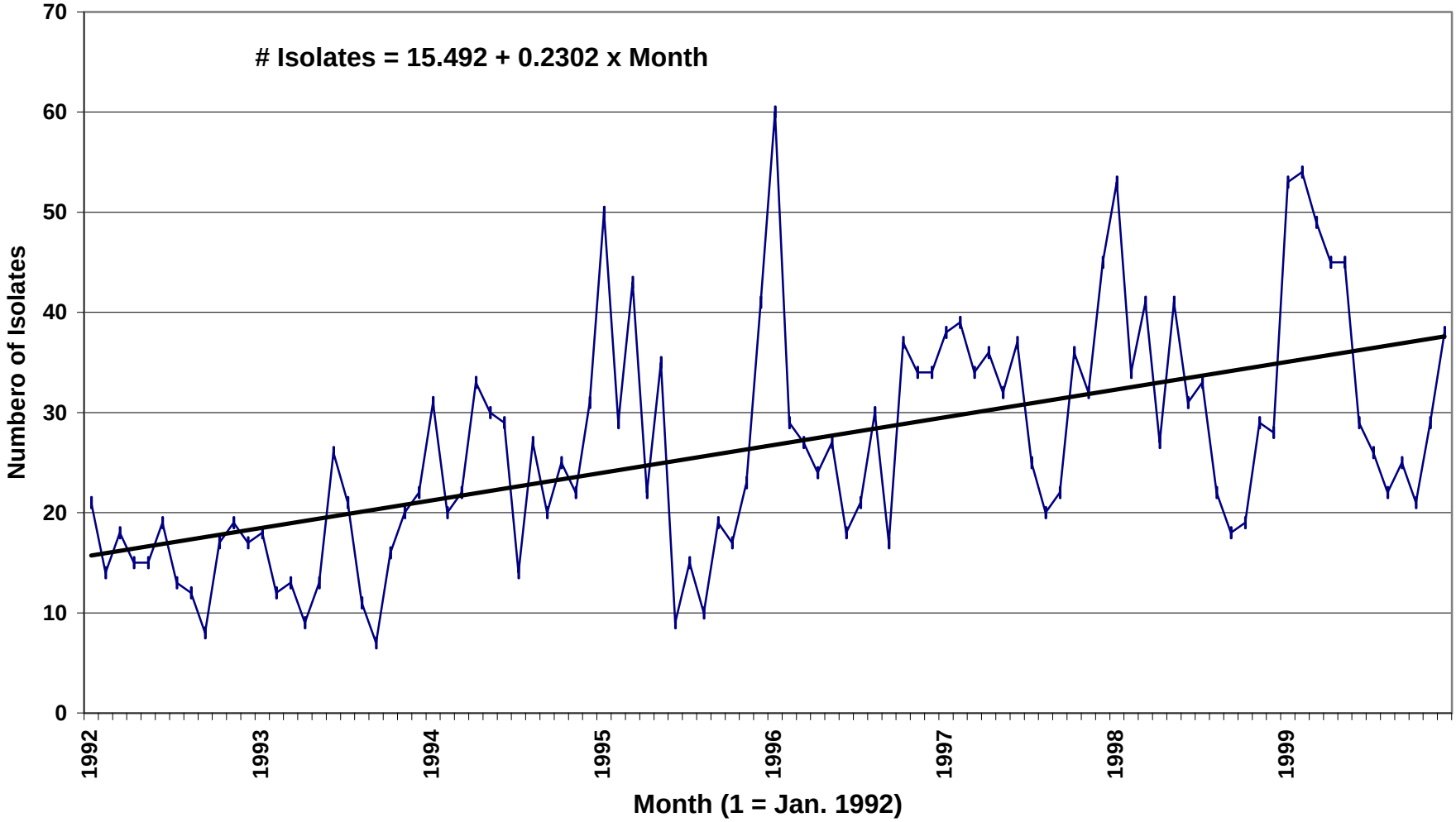


Exhibit 15 : Penicillin-Resistant Streptococci / Enterococci Blood Isolates by County, 1999
In Descending Order of Number of Isolates per 100,000 Population

County	Num. Isolates	Percentage	Isolates / 100,000 Population
Essex	148	33.94%	19.80
Salem	6	1.38%	9.30
Camden	43	9.86%	8.55
Middlesex	58	13.30%	8.08
Hudson	28	6.42%	5.06
Bergen	42	9.63%	4.90
Ocean	20	4.59%	4.02
Hunterdon - Somerset *	14	3.21%	3.39
Passaic	16	3.67%	3.30
Sussex - Warren *	8	1.83%	3.27
Monmouth	18	4.13%	2.94
Mercer	9	2.06%	2.70
Morris	9	2.06%	1.94
Union	9	2.06%	1.80
Cumberland	2	0.46%	1.43
Gloucester	3	0.69%	1.20
Atlantic - Cape May *	2	0.46%	0.59
Burlington	1	0.23%	0.24
State Total	**436**	**100.00%**	**5.35**

Rate = Number of isolates per 100,000 resident population in each county.

* Data for these two neighboring counties were aggregated according to guidelines of confidentiality disclosure.

Exhibit 16 : Trend of Penicillin-Resistant *Streptococcus pneumoniae* Blood Isolates, 1992-1999 (Original and Seasonally Adjusted Series)

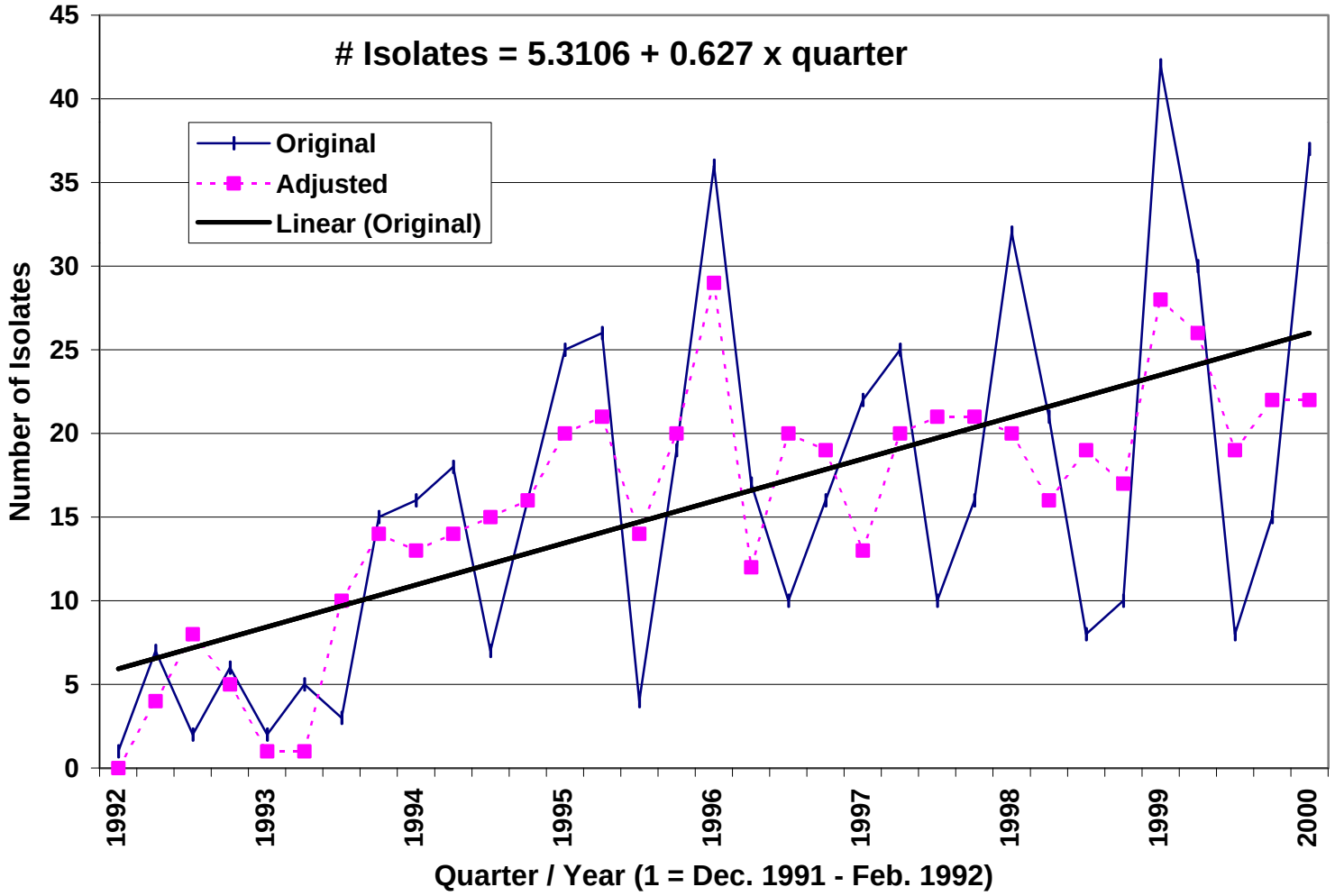


Exhibit 17 : Penicillin-Resistant *Streptococcus pneumoniae* Blood Isolates by County, 1999
In Descending Order of Number of Isolates per 100,000 Population

County	Num. Isolates	Percentage	Isolates / 100,000 Population
Salem	3	3.06%	4.65
Camden	11	11.22%	2.19
Bergen	18	18.37%	2.10
Essex	14	14.29%	1.87
Hunterdon - Somerset *	7	7.14%	1.70
Sussex - Warren *	4	4.08%	1.63
Middlesex	11	11.22%	1.53
Hudson	8	8.16%	1.45
Union	7	7.14%	1.40
Gloucester	3	3.06%	1.20
Morris	5	5.10%	1.08
Atlantic	1	1.02%	0.42
Passaic	2	2.04%	0.41
Ocean	2	2.04%	0.40
Burlington	1	1.02%	0.24
Monmouth	1	1.02%	0.16
State Total	**98**	**100.00%**	**1.20**

Rate = Number of isolates per 100,000 resident population in each county.

* Data for these two neighboring counties were aggregated according to guidelines of confidentiality disclosure.

Exhibit 18 : Drug Resistant Profile in Penicillin-Resistant Streptococci Blood Isolates, 1993-1999

Antibiotic	Year / Organism	1993 %R	n	1994 %R	n	1995 %R	n	1996 %R	n	1997 %R	n	1998 %R	n	1999 %R	n
Ampicilin	***Strep. pneumoniae***	53.85%	13	58.33%	12	87.50%	8	100.00%	2	100.00%	11	100.00%	6	66.67%	9
	Viridans Streptococci	100.00%	6	85.71%	7	-	-	62.50%	8	77.78%	9	80.00%	10	100.00%	6
Oxacillin/Methicillin	***Strep. pneumoniae***	100.00%	9	100.00%	13	100.00%	12	100.00%	11	100.00%	11	66.67%	3	100.00%	8
/Nafcillin	**Viridans Streptococci**	100.00%	2	66.67%	6	100.00%	1	100.00%	7	0.00%	2	0.00%	1	-	-
Cefazolin	***Strep. pneumoniae***	0.00%	10	3.85%	26	9.09%	11	16.67%	6	0.00%	10	0.00%	5	0.00%	7
	Viridans Streptococci	25.00%	4	33.33%	3	33.33%	3	0.00%	4	16.67%	6	0.00%	5	-	-
Cefotaxime	***Strep. pneumoniae***	0.00%	6	0.00%	8	29.41%	17	15.38%	13	25.00%	8	20.00%	15	16.67%	24
	Viridans Streptococci	50.00%	2	0.00%	1	-	-	0.00%	1	54.55%	11	55.56%	9	83.33%	6
Ceftriaxone	***Strep. pneumoniae***	0.00%	3	0.00%	10	14.29%	21	7.14%	28	19.51%	41	10.42%	48	12.50%	72
	Viridans Streptococci	0.00%	3	0.00%	2	0.00%	2	33.33%	3	53.85%	13	50.00%	8	87.50%	8
Cefuroxime	***Strep. pneumoniae***	-	-	-	-	-	-	-	-	-	-	-	-	85.71%	7
	Viridans Streptococci	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gentamicin	***Strep. pneumoniae***	80.00%	10	58.82%	17	71.43%	7	-	-	75.00%	8	66.67%	3	50.00%	4
	Viridans Streptococci	50.00%	2	20.00%	5	-	-	40.00%	5	0.00%	2	0.00%	5	-	-
Erythromycin	***Strep. pneumoniae***	0.00%	18	8.11%	37	18.18%	55	28.57%	35	28.57%	42	40.82%	49	53.03%	66
	Viridans Streptococci	62.50%	8	37.50%	8	40.00%	5	25.00%	8	55.56%	18	71.43%	14	90.00%	10
Azithromycin	***Strep. pneumoniae***	-	-	-	-	-	-	-	-	-	-	-	-	33.33%	6
	Viridans Streptococci	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clarithromycin	***Strep. pneumoniae***	-	-	-	-	-	-	-	-	-	-	-	-	20.00%	5
	Viridans Streptococci	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Antibiotic	Year / Organism	1993 %R	n	1994 %R	n	1995 %R	n	1996 %R	n	1997 %R	n	1998 %R	n	1999 %R	n
Ciprofloxacin	***Strep. pneumoniae***	0.00%	11	0.00%	11	0.00%	5	0.00%	8	16.67%	6	0.00%	4	0.00%	4
	Viridans Streptococci	0.00%	3	0.00%	4	0.00%	1	25.00%	8	50.00%	2	20.00%	5	-	-
Levofloxacin	***Strep. pneumoniae***	-	-	-	-	-	-	-	-	-	-	-	-	8.33%	24
	Viridans Streptococci	-	-	-	-	-	-	-	-	-	-	-	-	0.00%	1
Chloramphenicol	***Strep. pneumoniae***	0.00%	12	0.00%	25	21.62%	37	19.44%	36	22.58%	31	10.00%	40	16.33%	49
	Viridans Streptococci	0.00%	4	-	-	0.00%	1	0.00%	3	0.00%	13	25.00%	8	0.00%	10
Rifampin	***Strep. pneumoniae***	-	-	-	-	-	-	-	-	-	-	-	-	0.00%	7
	Viridans Streptococci	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clindamycin	***Strep. pneumoniae***	0.00%	3	0.00%	9	0.00%	8	14.29%	7	28.57%	7	25.00%	16	7.14%	28
	Viridans Streptococci	40.00%	5	33.33%	3	0.00%	1	20.00%	5	10.00%	10	33.33%	9	10.00%	10
Tetracycline	***Strep. pneumoniae***	0.00%	12	0.00%	24	24.00%	25	22.73%	22	39.29%	28	28.57%	35	35.90%	39
	Viridans Streptococci	37.50%	8	0.00%	5	0.00%	4	16.67%	6	23.53%	17	42.86%	14	33.33%	9
Trimethoprim	***Strep. pneumoniae***	0.00%	2	66.67%	3	54.55%	11	76.47%	17	75.00%	12	64.52%	31	81.58%	38
/Sulfamethoxazole	**Viridans Streptococci**	-	-	50.00%	2	0.00%	1	33.33%	6	0.00%	2	40.00%	5	-	-
Vancomycin	***Strep. pneumoniae***	0.00%	18	0.00%	44	0.00%	70	1.59%	63	0.00%	67	0.00%	66	0.00%	89
	Viridans Streptococci	0.00%	2	0.00%	4	0.00%	2	25.00%	8	0.00%	14	0.00%	13	0.00%	10

n = Number of isolates tested for the specific antibiotic.

Exhibit 19 : Amikacin-Resistant Gram-Negative Bacilli Blood Isolates, 1993-1999

Organism Name	1993 Frequency		1994 Frequency		1995 Frequency		1996 Frequency		1997 Frequency		1998 Frequency		1999 Frequency	
Stenotrophomonas maltophilia	23	41.82%	29	28.71%	21	25.00%	30	37.04%	38	35.85%	35	30.17%	24	20.51%
Pseudomonas aeruginosa	12	21.82%	28	27.72%	17	20.24%	5	6.17%	7	6.60%	13	11.21%	7	5.98%
Pseudomonas alcaligenes	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.86%	0	0.00%
Pseudomonas paucimobilis	0	0.00%	0	0.00%	0	0.00%	1	1.23%	0	0.00%	0	0.00%	0	0.00%
Pseudomonas fluorescens	1	1.82%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.86%	1	0.85%
Pseudomonas spp.	2	3.64%	0	0.00%	1	1.19%	0	0.00%	3	2.83%	2	1.72%	0	0.00%
Bordetella bronchiseptica	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.94%	0	0.00%	0	0.00%
Burkholderia cepacia	8	14.55%	8	7.92%	7	8.33%	7	8.64%	5	4.72%	3	2.59%	4	3.42%
Burkholderia picketti	0	0.00%	1	0.99%	1	1.19%	2	2.47%	1	0.94%	0	0.00%	0	0.00%
Burkholderia pseudomallei	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.94%	0	0.00%	0	0.00%
Alcaligenes xylosoxidans	0	0.00%	7	6.93%	5	5.95%	4	4.94%	6	5.66%	3	2.59%	2	1.71%
Flavobacterium meningosepticum	0	0.00%	3	2.97%	1	1.19%	3	3.70%	4	3.77%	3	2.59%	0	0.00%
Flavobacterium spp.	1	1.82%	3	2.97%	4	4.76%	1	1.23%	3	2.83%	1	0.86%	0	0.00%
Acinetobacter baumannii	0	0.00%	0	0.00%	3	3.57%	2	2.47%	10	9.43%	12	10.34%	18	15.38%
Acinetobacter lwoffii	0	0.00%	1	0.99%	1	1.19%	0	0.00%	1	0.94%	1	0.86%	0	0.00%
Acinetobacter calcoaceticus / anitratus	1	1.82%	2	1.98%	2	2.38%	2	2.47%	0	0.00%	1	0.86%	1	0.85%
Acinetobacter spp.	2	3.64%	1	0.99%	0	0.00%	1	1.23%	1	0.94%	0	0.00%	0	0.00%
Aeromonas hydrophilia	0	0.00%	0	0.00%	1	1.19%	0	0.00%	1	0.94%	0	0.00%	0	0.00%
Achromobacter xylosoxidans	0	0.00%	2	1.98%	0	0.00%	1	1.23%	0	0.00%	4	3.45%	1	0.85%
Xanthomonas spp.	0	0.00%	0	0.00%	1	1.19%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Comamonas acidovora	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.86%	0	0.00%
Agrobacterium radiobacter	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.86%	0	0.00%
Empedobacter brevis	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.86%	0	0.00%
Myroides odoratum	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.85%

Organism Name	1993 Frequency		1994 Frequency		1995 Frequency		1996 Frequency		1997 Frequency		1998 Frequency		1999 Frequency	
Enterobacteriaceae	**5**	**9.09%**	**16**	**15.84%**	**19**	**22.62%**	**22**	**27.16%**	**24**	**22.64%**	**33**	**28.45%**	**58**	**49.57%**
Klebsiella pneumoniae	4	7.27%	8	7.92%	11	13.10%	10	12.35%	17	16.04%	28	24.14%	46	39.32%
Klebsiella oxytoca	0	0.00%	0	0.00%	0	0.00%	1	1.23%	1	0.94%	0	0.00%	0	0.00%
Morganella morganii	0	0.00%	2	1.98%	1	1.19%	0	0.00%	0	0.00%	0	0.00%	1	0.85%
Serratia marcescens	0	0.00%	0	0.00%	1	1.19%	2	2.47%	0	0.00%	0	0.00%	2	1.71%
Proteus mirabilis	0	0.00%	4	3.96%	1	1.19%	1	1.23%	1	0.94%	1	0.86%	0	0.00%
Proteus vulgaris	0	0.00%	0	0.00%	1	1.19%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Enterobacter aerogenes	0	0.00%	0	0.00%	1	1.19%	0	0.00%	0	0.00%	1	0.86%	1	0.85%
Enterobacter cloacae	0	0.00%	0	0.00%	0	0.00%	4	4.94%	2	1.89%	0	0.00%	3	2.56%
Enterobacter amnigenus	0	0.00%	1	0.99%	1	1.19%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Escherichia coli	1	1.82%	0	0.00%	0	0.00%	1	1.23%	3	2.83%	3	2.59%	3	2.56%
Providencia stuartii	0	0.00%	1	0.99%	1	1.19%	3	3.70%	0	0.00%	0	0.00%	1	0.85%
Citrobacter freundii	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.85%
Hafnia alvei	0	0.00%	0	0.00%	1	1.19%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
State Total	**55**	**100.00%**	**101**	**100.00%**	**84**	**100.00%**	**81**	**100.00%**	**106**	**100.00%**	**116**	**100.00%**	**117**	**100.00%**

Exhibit 20 : Trend of Amikacin-Resistant Gram-Negative Bacilli Blood Isolates, 1992-1999

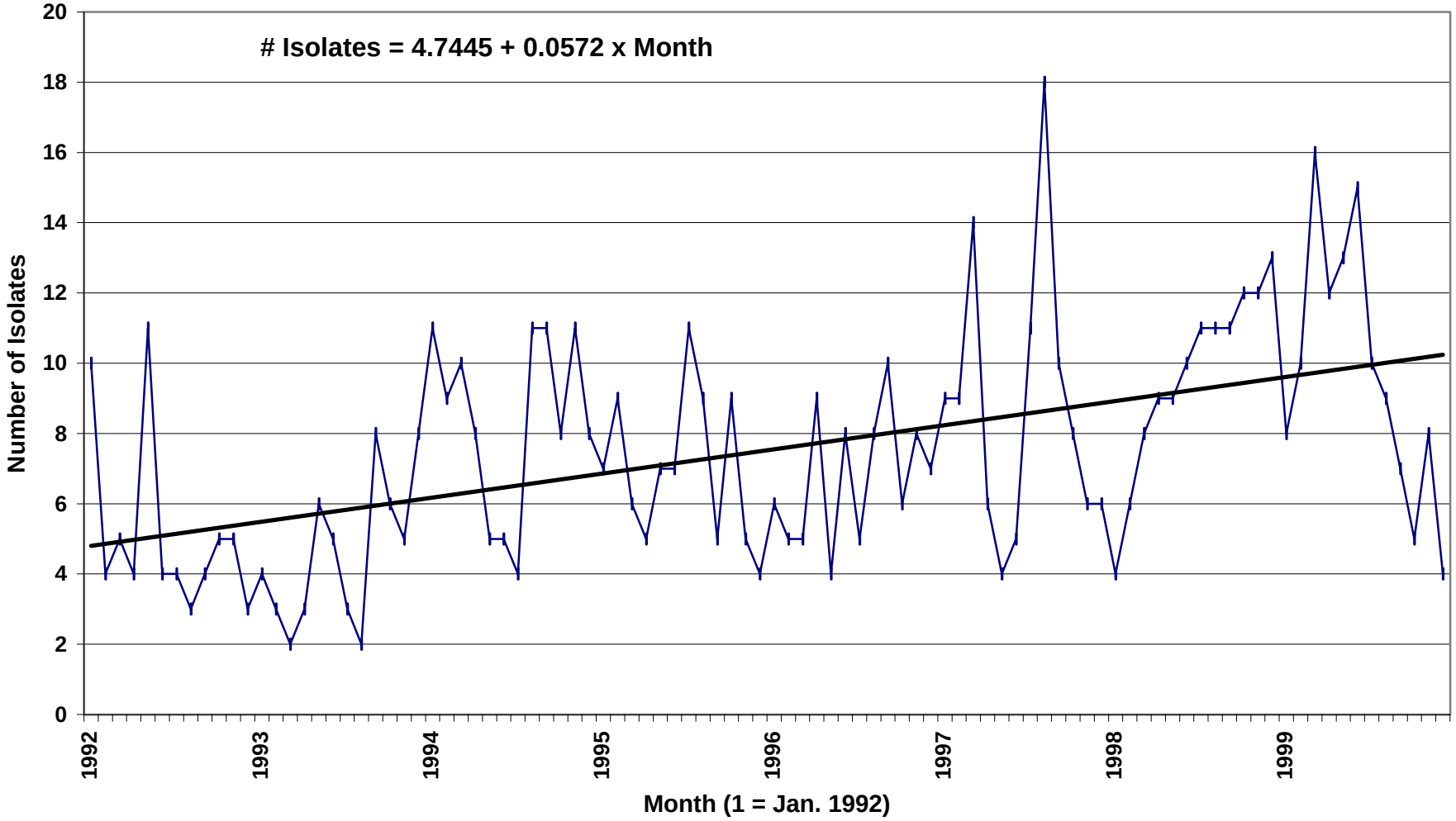


Exhibit 21 : Amikacin-Resistant Gram-Negative Bacilli Blood Isolates by County, 1999
In Descending Order of Number of Isolates per 100,000 Population

County	Num. Isolates	Percentage	Isolates / 100,000 Population
Essex	37	31.62%	4.95
Mercer	14	11.97%	4.19
Middlesex	20	17.09%	2.79
Ocean	13	11.11%	2.61
Morris	11	9.40%	2.37
Passaic	5	4.27%	1.03
Union	4	3.42%	0.80
Camden	4	3.42%	0.80
Bergen	4	3.42%	0.47
Sussex - Warren *	1	0.85%	0.41
Gloucester	1	0.85%	0.40
Hudson	2	1.71%	0.36
Monmouth	1	0.85%	0.16
State Total	**117**	**100.00%**	**1.44**

Rate = Number of isolates per 100,000 resident population in each county.

* Data for these two neighboring counties were aggregated according to guidelines of confidentiality disclosure.

Exhibit 22 : Imipenem-Resistant Gram-Negative Bacilli Isolated from Blood Cultures, 1993-1999

Organism Name	1993 Frequency		1994 Frequency		1995 Frequency		1996 Frequency		1997 Frequency		1998 Frequency		1999 Frequency	
Pseudomonas aeruginosa	23	24.47%	29	28.43%	35	32.11%	23	25.00%	30	25.21%	50	37.31%	52	35.14%
Pseudomonas fluorescens	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.84%	3	2.24%	1	0.68%
Pseudomonas spp.	1	1.06%	0	0.00%	0	0.00%	0	0.00%	3	2.52%	2	1.49%	0	0.00%
Stenotrophomonas maltophilia	32	34.04%	31	30.39%	30	27.52%	33	35.87%	42	35.29%	33	24.63%	27	18.24%
Burkholderia cepacia	5	5.32%	5	4.90%	6	5.50%	6	6.52%	3	2.52%	4	2.99%	3	2.03%
Burkholderia picketti	0	0.00%	0	0.00%	0	0.00%	2	2.17%	0	0.00%	0	0.00%	0	0.00%
Burkholderia pseudomallei	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.84%	0	0.00%	0	0.00%
Flavobacterium meningosepticum	0	0.00%	3	2.94%	1	0.92%	3	3.26%	6	5.04%	5	3.73%	2	1.35%
Flavobacterium spp.	0	0.00%	2	1.96%	3	2.75%	1	1.09%	2	1.68%	0	0.00%	0	0.00%
Acinetobacter lwoffii	1	1.06%	1	0.98%	0	0.00%	0	0.00%	1	0.84%	0	0.00%	1	0.68%
Acinetobacter baumannii	0	0.00%	0	0.00%	0	0.00%	1	1.09%	6	5.04%	7	5.22%	6	4.05%
Acinetobacter calcoaceticus / anitratus	0	0.00%	1	0.98%	1	0.92%	2	2.17%	4	3.36%	13	9.70%	29	19.59%
Acinetobacter spp.	0	0.00%	2	1.96%	1	0.92%	0	0.00%	3	2.52%	0	0.00%	0	0.00%
Aeromonas hydrophilia	0	0.00%	1	0.98%	1	0.92%	2	2.17%	0	0.00%	0	0.00%	1	0.68%
Alcaligenes xylosoxidans	0	0.00%	0	0.00%	0	0.00%	2	2.17%	0	0.00%	1	0.75%	0	0.00%
Achromobacter xylosoxidans	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.84%	1	0.75%	2	1.35%
Xanthomonas spp.	0	0.00%	0	0.00%	1	0.92%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Comamonas acidovora	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.75%	0	0.00%
Myroides adoratum	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.68%
Enterobacteriaceae	**32**	**34.04%**	**27**	**26.47%**	**30**	**27.52%**	**17**	**18.48%**	**16**	**13.45%**	**14**	**10.45%**	**23**	**15.54%**
Proteus mirabilis	16	17.02%	19	18.63%	15	13.76%	6	6.52%	4	3.36%	3	2.24%	3	2.03%
Proteus vulgaris	1	1.06%	0	0.00%	2	1.83%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Serratia marcescens	3	3.19%	0	0.00%	4	3.67%	1	1.09%	3	2.52%	1	0.75%	1	0.68%
Morganella morganii	2	2.13%	3	2.94%	2	1.83%	1	1.09%	1	0.84%	1	0.75%	3	2.03%
Enterobacter cloacae	0	0.00%	0	0.00%	2	1.83%	1	1.09%	1	0.84%	0	0.00%	6	4.05%
Enterobacter aerogenes	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.68%
Enterobacter agglomerans	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.68%
Klebsiella pneumoniae	3	3.19%	2	1.96%	3	2.75%	1	1.09%	2	1.68%	4	2.99%	1	0.68%
Klebsiella ornithinolytica	1	1.06%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Klebsiella oxytoca	1	1.06%	0	0.00%	0	0.00%	0	0.00%	1	0.84%	0	0.00%	0	0.00%
Escherichia coli	4	4.26%	0	0.00%	0	0.00%	5	5.43%	3	2.52%	3	2.24%	4	2.70%
Salmonella spp.	0	0.00%	1	0.98%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Providencia stuartii	1	1.06%	2	1.96%	1	0.92%	2	2.17%	1	0.84%	1	0.75%	2	1.35%
Providencia rettgeri	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.75%	0	0.00%
Hafnia alvei	0	0.00%	0	0.00%	1	0.92%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Citrobacter freundii	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.68%
Total	**94**	**100.0%**	**102**	**100.0%**	**109**	**100.0%**	**92**	**100.0%**	**119**	**100.0%**	**134**	**100.0%**	**148**	**100.0%**

Exhibit 23 : Trend of Imipenem-Resistant Gram-Negative Bacilli Blood Isolates, 1992-1999

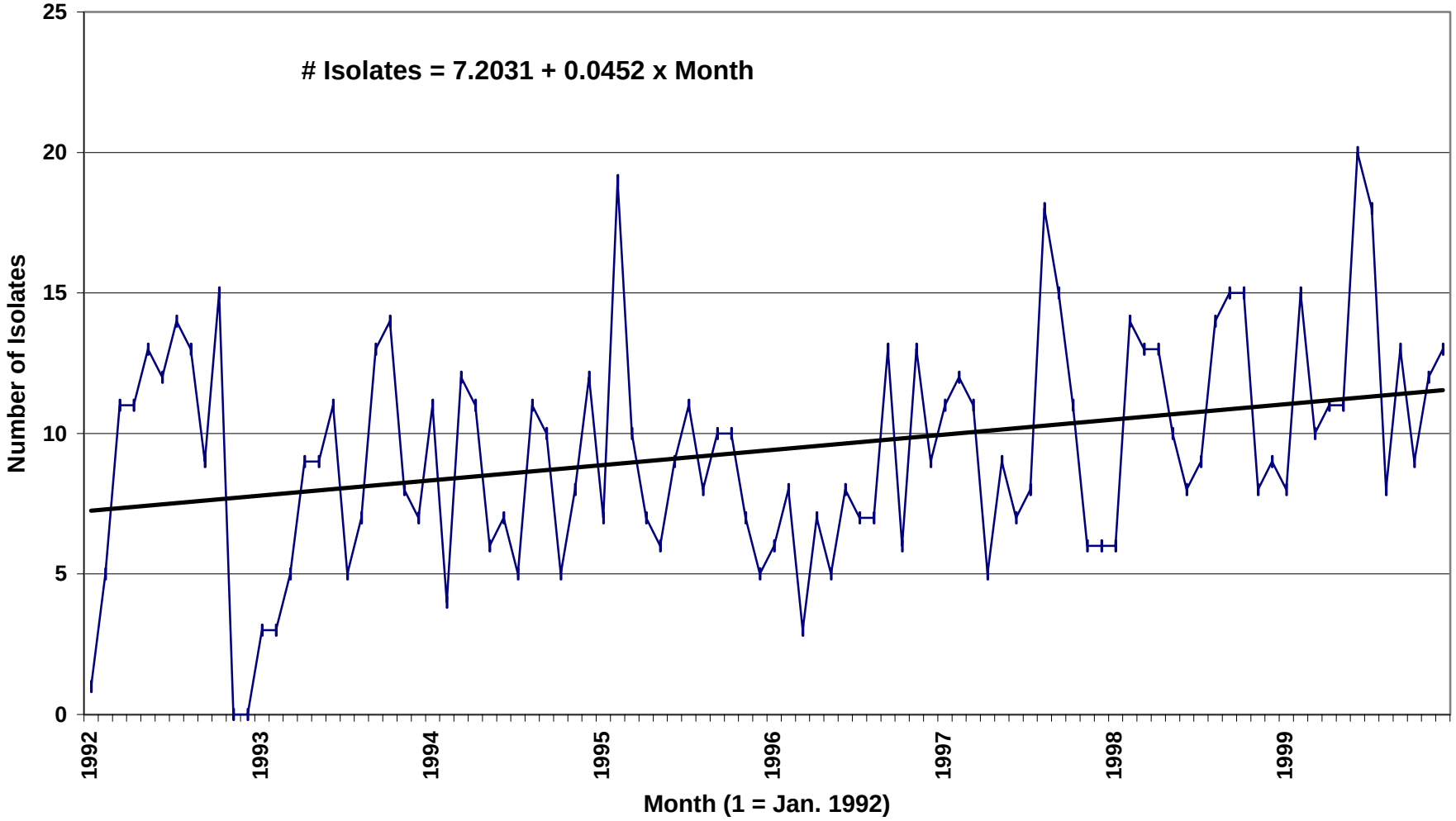


Exhibit 24 : Imipenem-Resistant Gram-Negative Bacilli Blood Isolates by County, 1999
In Descending Order of Number of Isolates per 100,000 Population

County	Num. Isolates	Percentage	Isolates / 100,000 Population
Essex	41	27.70%	5.49
Hudson	30	20.27%	5.43
Middlesex	25	16.89%	3.48
Passaic	9	6.08%	1.86
Sussex - Warren *	4	2.70%	1.63
Cumberland	2	1.35%	1.43
Morris	6	4.05%	1.29
Bergen	9	6.08%	1.05
Camden	5	3.38%	0.99
Monmouth	6	4.05%	0.98
Union	4	2.70%	0.80
Ocean	3	2.03%	0.60
Hunterdon - Somerset *	2	1.35%	0.48
Gloucester	1	0.68%	0.40
Mercer	1	0.68%	0.30
State Total	**148**	**100.00%**	**1.82**

Rate = Number of isolates per 100,000 resident population in each county.

* Data for these two neighboring counties were aggregated according to guidelines of confidentiality disclosure.

Exhibit 25 : Multiple Drug Resistance in Major *Enterobacteriaceae* Blood Isolates, 1992-1999

Antibiotic	Year / Organism	1993 %R	1993 n	1994 %R	1994 n	1995 %R	1995 n	1996 %R	1996 n	1997 %R	1997 n	1998 %R	1998 n	1999 %R	1999 n
Imipenem	*K. pneumoniae*	33.33%	9	20.00%	10	11.54%	26	5.88%	17	5.56%	36	9.30%	43	1.75%	57
	P. mirabilis	100.00%	16	100.00%	19	100.00%	15	66.67%	9	44.44%	9	50.00%	6	60.00%	5
	E. cloacae	-	-	-	-	100.00%	2	16.67%	6	16.67%	6	0.00%	6	46.15%	13
	E. coli	57.14%	7	0.00%	2	0.00%	4	71.43%	7	25.00%	12	25.00%	12	25.00%	16
	S. marcescens	50.00%	6	0.00%	2	66.67%	6	16.67%	6	100.00%	3	50.00%	2	16.67%	6
Aztreonam	*K. pneumoniae*	33.33%	9	71.43%	7	84.62%	13	71.43%	7	75.00%	16	78.57%	14	88.89%	18
	P. mirabilis	11.11%	9	8.33%	12	10.00%	10	60.00%	5	100.00%	2	-	-	100.00%	2
	E. cloacae	-	-	-	-	100.00%	1	100.00%	4	100.00%	3	-	-	75.00%	4
	E. coli	20.00%	5	-	-	-	-	0.00%	3	33.33%	6	33.33%	3	80.00%	5
	S. marcescens	0.00%	1	-	-	0.00%	1	0.00%	2	66.67%	3	0.00%	1	0.00%	1
Cefazolin	*K. pneumoniae*	60.00%	10	86.67%	15	89.29%	28	76.47%	17	80.56%	36	80.00%	45	79.66%	59
	P. mirabilis	0.00%	14	6.25%	16	27.27%	11	12.50%	8	28.57%	7	20.00%	5	20.00%	5
	E. cloacae	-	-	-	-	100.00%	2	83.33%	6	100.00%	5	100.00%	6	100.00%	11
	E. coli	14.29%	7	33.33%	3	20.00%	5	14.29%	7	20.00%	15	61.54%	13	56.25%	16
	S. marcescens	100.00%	5	100.00%	2	100.00%	5	100.00%	4	100.00%	2	100.00%	2	100.00%	8
Ceftazidime	*K. pneumoniae*	33.33%	9	60.00%	10	55.00%	20	69.23%	13	64.00%	25	74.29%	35	69.81%	53
	P. mirabilis	0.00%	6	15.38%	13	0.00%	5	0.00%	6	14.29%	7	0.00%	5	20.00%	5
	E. cloacae	-	-	-	-	100.00%	2	100.00%	4	100.00%	4	66.67%	3	55.56%	9
	E. coli	20.00%	5	0.00%	1	0.00%	1	20.00%	5	25.00%	12	66.67%	9	71.43%	14
	S. marcescens	0.00%	2	-	-	-	-	50.00%	4	0.00%	1	100.00%	1	0.00%	3
Ceftriaxone	*K. pneumoniae*	12.50%	8	28.57%	7	37.50%	8	28.57%	7	36.84%	19	34.62%	26	36.59%	41
	P. mirabilis	0.00%	7	22.22%	9	0.00%	3	0.00%	5	0.00%	1	0.00%	1	0.00%	2
	E. cloacae	-	-	-	-	100.00%	2	100.00%	4	33.33%	3	0.00%	1	45.45%	11
	E. coli	20.00%	5	0.00%	1	-	-	0.00%	2	25.00%	4	0.00%	5	0.00%	4
	S. marcescens	50.00%	2	-	-	100.00%	1	50.00%	2	-	-	0.00%	1	0.00%	3

Antibiotic	Year / Organism	1993 %R	n	1994 %R	n	1995 %R	n	1996 %R	n	1997 %R	n	1998 %R	n	1999 %R	n
Ampicillin	*K. pneumoniae*	100.00%	10	100.00%	16	100.00%	30	100.00%	19	94.74%	38	100.00%	43	100.00%	61
	P. mirabilis	5.88%	17	20.00%	20	26.67%	15	44.44%	9	62.50%	8	60.00%	5	80.00%	5
	E. cloacae	-	-	-	-	100.00%	2	100.00%	6	100.00%	6	100.00%	6	100.00%	12
	E. coli	28.57%	7	66.67%	3	100.00%	3	37.50%	8	64.29%	14	76.92%	13	94.12%	17
	S. marcescens	100.00%	6	100.00%	2	100.00%	5	100.00%	6	100.00%	3	100.00%	2	100.00%	7
Ampicillin-sulbactam	*K. pneumoniae*	75.00%	4	100.00%	1	0.00%	1	100.00%	1	100.00%	3	85.71%	7	66.67%	24
	P. mirabilis	-	-	-	-	0.00%	1	-	-	-	-	-	-	33.33%	3
	E. cloacae	-	-	-	-	-	-	-	-	-	-	-	-	100.00%	4
	E. coli	-	-	-	-	-	-	-	-	0.00%	3	100.00%	1	77.78%	9
	S. marcescens	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Piperacillin	*K. pneumoniae*	100.00%	7	87.50%	8	92.86%	14	88.89%	9	86.96%	23	82.14%	28	76.09%	46
	P. mirabilis	21.43%	14	0.00%	12	8.33%	12	40.00%	5	50.00%	2	0.00%	1	66.67%	3
	E. cloacae	-	-	-	-	100.00%	1	100.00%	6	75.00%	4	66.67%	3	63.64%	11
	E. coli	16.67%	6	50.00%	2	33.33%	3	50.00%	2	28.57%	7	83.33%	6	85.71%	7
	S. marcescens	20.00%	5	50.00%	2	-	-	0.00%	4	0.00%	1	0.00%	2	33.33%	3
Ciprofloxacin	*K. pneumoniae*	25.00%	8	21.43%	14	41.38%	29	50.00%	16	45.71%	35	40.91%	44	50.00%	58
	P. mirabilis	0.00%	16	0.00%	20	0.00%	12	22.22%	9	11.11%	9	50.00%	6	0.00%	5
	E. cloacae	-	-	-	-	0.00%	2	66.67%	6	0.00%	5	60.00%	5	63.64%	11
	E. coli	0.00%	6	50.00%	2	0.00%	5	12.50%	8	40.00%	15	83.33%	12	64.71%	17
	S. marcescens	16.67%	6	50.00%	2	25.00%	4	16.67%	6	0.00%	3	0.00%	2	20.00%	5
Tobramycin	*K. pneumoniae*	100.00%	7	83.33%	12	89.29%	28	94.12%	17	91.43%	35	95.45%	44	98.28%	58
	P. mirabilis	0.00%	14	33.33%	15	9.09%	11	42.86%	7	42.86%	7	40.00%	5	33.33%	3
	E. cloacae	-	-	-	-	50.00%	2	83.33%	6	66.67%	6	40.00%	5	78.57%	14
	E. coli	50.00%	6	66.67%	3	60.00%	5	25.00%	4	41.67%	12	53.85%	13	75.00%	16
	S. marcescens	50.00%	6	100.00%	2	50.00%	4	50.00%	6	0.00%	1	50.00%	2	100.00%	7
Gentamicin	*K. pneumoniae*	60.00%	10	87.50%	16	93.55%	31	89.47%	19	83.78%	37	90.91%	44	98.33%	60
	P. mirabilis	7.14%	14	22.22%	18	8.33%	12	55.56%	9	27.27%	11	60.00%	5	20.00%	5
	E. cloacae	-	-	-	-	50.00%	2	100.00%	6	66.67%	6	100.00%	6	85.71%	14
	E. coli	42.86%	7	100.00%	3	100.00%	5	37.50%	8	66.67%	15	73.33%	15	68.75%	16
	S. marcescens	50.00%	6	100.00%	2	20.00%	5	66.67%	6	0.00%	3	0.00%	2	87.50%	8

Antibiotic	Year / Organism	1993 %R	n	1994 %R	n	1995 %R	n	1996 %R	n	1997 %R	n	1998 %R	n	1999 %R	n
Amikacin	***K. pneumoniae***	50.00%	8	72.73%	11	45.83%	24	55.56%	18	60.71%	28	68.29%	41	80.70%	57
	P. mirabilis	0.00%	7	28.57%	14	8.33%	12	7.69%	13	16.67%	6	20.00%	5	0.00%	3
	E. cloacae	-	-	-	-	0.00%	2	-	-	40.00%	5	0.00%	4	23.08%	13
	E. coli	20.00%	5	-	-	0.00%	3	25.00%	4	27.27%	11	27.27%	11	23.08%	13
	S. marcescens	0.00%	3	-	-	50.00%	2	50.00%	4	0.00%	1	0.00%	1	50.00%	4
Trimethoprim/ Sulfamethoxazole	***K. pneumoniae***	62.50%	8	71.43%	14	69.57%	23	57.89%	19	75.76%	33	88.37%	43	85.00%	60
	P. mirabilis	14.29%	14	10.53%	19	30.77%	13	28.57%	7	28.57%	7	75.00%	4	20.00%	5
	E. cloacae	-	-	-	-	100.00%	2	50.00%	6	50.00%	4	83.33%	6	64.29%	14
	E. coli	16.67%	6	50.00%	2	25.00%	4	37.50%	8	9.09%	11	69.23%	13	81.25%	16
	S. marcescens	20.00%	5	100.00%	2	0.00%	3	25.00%	4	0.00%	2	0.00%	2	28.57%	7

n = Number of isolates tested for the specific antibiotic.

Exhibit 26 : Multiple Drug Resistance in Gram-Negative Bacilli Blood Isolates, 1992-1999

	Year	1993		1994		1995		1996		1997		1998		1999	
Antibiotic	**Organism**	**%R**	**n**	**%R**	**n**	**%R**	**n**	**%R**	**n**	**%R**	**n**	**%R**	**n**	**%R**	**n**
	P. aeruginosa	69.70%	33	70.73%	41	77.78%	45	71.88%	32	73.17%	41	90.91%	55	86.67%	60
	S. maltophilia	96.97%	33	100.00%	31	96.77%	31	100.00%	33	100.00%	42	100.00%	33	100.00%	26
Imipenem	***B. cepacia***	62.50%	8	50.00%	10	66.67%	9	85.71%	7	60.00%	5	100.00%	4	75.00%	4
	F. meningosepticum	-	-	100.00%	3	100.00%	1	100.00%	3	85.71%	7	100.00%	5	100.00%	2
	A. baumannii	-	-	-	-	0.00%	3	33.33%	3	46.15%	13	25.00%	28	18.75%	32
	A. calcoaceticus / anitratus	0.00%	2	33.33%	3	11.11%	9	22.22%	9	66.67%	6	76.47%	17	62.50%	16
	P. aeruginosa	30.00%	30	35.29%	34	41.67%	36	39.29%	28	51.52%	33	57.78%	45	57.78%	45
	S. maltophilia	83.33%	30	81.82%	22	84.00%	25	89.29%	28	90.91%	33	75.76%	33	77.78%	27
Aztreonam	***B. cepacia***	75.00%	8	50.00%	8	14.29%	7	50.00%	4	60.00%	5	0.00%	2	100.00%	2
	F. meningosepticum	-	-	100.00%	2	-	-	100.00%	3	100.00%	7	100.00%	4	100.00%	2
	A. baumannii	-	-	-	-	50.00%	2	100.00%	1	100.00%	10	100.00%	9	100.00%	19
	A. calcoaceticus / anitratus	0.00%	1	100.00%	3	100.00%	2	100.00%	3	100.00%	2	100.00%	4	100.00%	10
	P. aeruginosa	25.00%	24	3.03%	33	27.27%	44	33.33%	27	33.33%	39	41.67%	48	38.18%	55
	S. maltophilia	33.33%	30	26.67%	30	18.52%	27	40.00%	30	53.66%	41	35.71%	42	31.25%	32
Ceftazidime	***B. cepacia***	37.50%	8	22.22%	9	0.00%	7	0.00%	7	20.00%	5	0.00%	4	40.00%	5
	F. meningosepticum	-	-	100.00%	2	100.00%	1	100.00%	1	100.00%	7	100.00%	5	100.00%	2
	A. baumannii	-	-	-	-	100.00%	2	0.00%	1	71.43%	14	90.48%	21	89.66%	29
	A. calcoaceticus / anitratus	0.00%	2	66.67%	3	0.00%	2	100.00%	3	100.00%	2	60.00%	5	75.00%	12
	P. aeruginosa	66.67%	12	57.14%	14	68.75%	16	100.00%	8	80.00%	20	78.13%	32	76.32%	38
	S. maltophilia	63.16%	19	75.00%	12	66.67%	18	71.43%	14	78.95%	19	64.71%	17	60.00%	10
Cefotaxime	***B. cepacia***	75.00%	4	50.00%	6	33.33%	3	0.00%	1	33.33%	3	0.00%	3	100.00%	1
	F. meningosepticum	-	-	100.00%	2	-	-	100.00%	3	66.67%	3	100.00%	1	100.00%	2
	A. baumannii	-	-	-	-	100.00%	2	100.00%	1	100.00%	11	89.47%	19	84.62%	26
	A. calcoaceticus / anitratus	33.33%	3	100.00%	3	57.14%	7	83.33%	6	50.00%	6	71.43%	14	59.26%	27

Antibiotic	Year / Organism	1993 %R	n	1994 %R	n	1995 %R	n	1996 %R	n	1997 %R	n	1998 %R	n	1999 %R	n
Ceftizoxime	***P. aeruginosa***	75.00%	4	85.71%	7	50.00%	8	83.33%	6	83.33%	18	95.45%	22	85.71%	14
	S. maltophilia	100.00%	6	42.86%	7	66.67%	9	87.50%	8	63.64%	11	75.00%	8	80.00%	5
	B. cepacia	100.00%	2	25.00%	4	0.00%	1	-	-	0.00%	2	0.00%	1	0.00%	1
	F. meningosepticum	-	-	-	-	-	-	-	-	50.00%	2	0.00%	2	100.00%	2
	A. baumannii	-	-	-	-	100.00%	1	-	-	-	-	100.00%	4	100.00%	3
	A. calcoaceticus / anitratus	-	-	50.00%	2	100.00%	1	100.00%	1	100.00%	1	0.00%	1	-	-
Ceftriaxone	***P. aeruginosa***	57.14%	14	61.11%	18	59.09%	22	88.89%	9	78.26%	23	72.73%	33	70.97%	31
	S. maltophilia	95.45%	22	87.50%	16	93.33%	15	88.24%	17	89.29%	28	68.18%	22	85.71%	14
	B. cepacia	80.00%	5	50.00%	8	100.00%	1	-	-	0.00%	2	0.00%	2	75.00%	4
	F. meningosepticum	-	-	100.00%	2	-	-	100.00%	3	75.00%	8	50.00%	2	50.00%	4
	A. baumannii	-	-	-	-	100.00%	2	100.00%	1	91.67%	12	90.00%	10	81.82%	22
	A. calcoaceticus / anitratus	0.00%	1	100.00%	3	50.00%	2	50.00%	2	50.00%	2	0.00%	3	83.33%	6
Cefepime	***P. aeruginosa***	-	-	-	-	-	-	-	-	0.00%	1	77.78%	9	40.00%	25
	S. maltophilia	-	-	-	-	-	-	-	-	-	-	50.00%	2	100.00%	5
	B. cepacia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F. meningosepticum	-	-	-	-	-	-	-	-	-	-	0.00%	1	100.00%	1
	A. baumannii	-	-	-	-	-	-	-	-	-	-	-	-	100.00%	7
	A. calcoaceticus / anitratus	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Piperacillin	***P. aeruginosa***	17.86%	28	20.69%	29	34.21%	38	51.72%	29	44.44%	36	61.82%	55	53.57%	56
	S. maltophilia	51.72%	29	60.00%	20	64.29%	28	66.67%	24	54.55%	44	27.27%	33	56.67%	30
	B. cepacia	28.57%	7	22.22%	9	33.33%	9	0.00%	7	20.00%	5	0.00%	4	100.00%	3
	F. meningosepticum	-	-	0.00%	2	0.00%	1	100.00%	3	0.00%	7	0.00%	1	100.00%	2
	A. baumannii	-	-	-	-	100.00%	2	-	-	83.33%	12	100.00%	11	72.22%	18
	A. calcoaceticus / anitratus	33.33%	3	100.00%	3	12.50%	8	75.00%	8	100.00%	6	64.71%	17	87.10%	31
Ticarcillin-clavulanic acid	***P. aeruginosa***	85.71%	7	85.71%	7	71.43%	7	100.00%	1	83.33%	6	95.65%	23	76.19%	21
	S. maltophilia	0.00%	1	40.00%	5	25.00%	4	0.00%	8	20.00%	10	0.00%	9	14.29%	7
	B. cepacia	-	-	-	-	-	-	-	-	0.00%	1	100.00%	1	100.00%	3
	F. meningosepticum	-	-	-	-	-	-	-	-	0.00%	1	0.00%	1	100.00%	2
	A. baumannii	-	-	-	-	-	-	-	-	85.71%	7	88.89%	9	60.00%	15
	A. calcoaceticus / anitratus	-	-	-	-	0.00%	1	0.00%	1	100.00%	1	0.00%	1	33.33%	3

Antibiotic	Year / Organism	1993 %R	1993 n	1994 %R	1994 n	1995 %R	1995 n	1996 %R	1996 n	1997 %R	1997 n	1998 %R	1998 n	1999 %R	1999 n
Ciprofloxacin	*P. aeruginosa*	32.26%	31	59.46%	37	54.35%	46	63.64%	33	75.00%	40	71.93%	57	71.93%	57
	S. maltophilia	48.65%	37	34.48%	29	30.30%	33	42.42%	33	33.33%	48	15.79%	38	9.09%	33
	B. cepacia	25.00%	8	36.36%	11	30.00%	10	0.00%	7	20.00%	5	0.00%	4	0.00%	2
	F. meningosepticum	-	-	50.00%	2	0.00%	1	66.67%	3	0.00%	6	25.00%	4	25.00%	4
	A. baumannii	-	-	-	-	100.00%	2	66.67%	3	90.91%	11	96.15%	26	96.30%	27
	A. calcoaceticus / anitratus	33.33%	3	100.00%	3	66.67%	9	77.78%	9	83.33%	6	93.75%	16	96.97%	33
Levofloxacin	*P. aeruginosa*	-	-	-	-	-	-	-	-	81.82%	11	90.48%	21	53.57%	28
	S. maltophilia	-	-	-	-	-	-	0.00%	1	33.33%	3	0.00%	4	0.00%	4
	B. cepacia	-	-	-	-	-	-	-	-	-	-	-	-	0.00%	1
	F. meningosepticum	-	-	-	-	-	-	-	-	-	-	0.00%	4	0.00%	1
	A. baumannii	-	-	-	-	-	-	-	-	100.00%	1	100.00%	6	83.33%	12
	A. calcoaceticus / anitratus	-	-	-	-	-	-	-	-	-	-	50.00%	2	100.00%	4
Tobramycin	*P. aeruginosa*	43.48%	23	68.42%	38	59.52%	42	55.88%	34	58.97%	39	76.60%	47	58.93%	56
	S. maltophilia	71.88%	32	75.76%	33	86.21%	29	82.14%	28	88.89%	45	86.11%	36	78.13%	32
	B. cepacia	100.00%	8	81.82%	11	100.00%	10	85.71%	7	100.00%	4	100.00%	4	100.00%	4
	F. meningosepticum	-	-	100.00%	2	100.00%	1	100.00%	3	100.00%	9	66.67%	3	75.00%	4
	A. baumannii	-	-	-	-	66.67%	3	50.00%	4	92.31%	13	57.14%	28	77.42%	31
	A. calcoaceticus / anitratus	-	-	0.00%	3	22.22%	9	11.11%	9	0.00%	6	12.50%	16	12.90%	31
Gentamicin	*P. aeruginosa*	62.50%	24	76.92%	39	57.14%	49	62.86%	35	83.72%	43	74.51%	51	59.32%	59
	S. maltophilia	69.44%	36	83.33%	36	62.50%	32	84.85%	33	93.33%	45	92.50%	40	64.71%	34
	B. cepacia	100.00%	8	90.91%	11	100.00%	10	85.71%	7	100.00%	4	100.00%	4	100.00%	5
	F. meningosepticum	-	-	100.00%	2	100.00%	1	100.00%	3	100.00%	14	66.67%	6	75.00%	4
	A. baumannii	-	-	-	-	66.67%	3	100.00%	4	77.78%	9	96.43%	28	90.32%	31
	A. calcoaceticus / anitratus	66.67%	3	100.00%	3	100.00%	9	100.00%	9	100.00%	6	100.00%	16	93.94%	33
Amikacin	*P. aeruginosa*	52.17%	23	71.79%	39	38.64%	44	16.67%	30	17.07%	41	27.08%	48	12.28%	57
	S. maltophilia	62.16%	37	80.56%	36	65.63%	32	90.91%	33	86.36%	44	81.40%	43	66.67%	36
	B. cepacia	100.00%	8	88.89%	9	87.50%	8	100.00%	7	100.00%	5	75.00%	4	100.00%	4
	F. meningosepticum	-	-	100.00%	3	100.00%	1	100.00%	3	57.14%	7	60.00%	5	0.00%	2
	A. baumannii	-	-	-	-	100.00%	3	50.00%	4	76.92%	13	44.44%	27	60.00%	30
	A. calcoaceticus / anitratus	100.00%	1	66.67%	3	100.00%	2	50.00%	4	0.00%	2	20.00%	5	8.33%	12

Antibiotic	Year / Organism	1993 %R	1993 n	1994 %R	1994 n	1995 %R	1995 n	1996 %R	1996 n	1997 %R	1997 n	1998 %R	1998 n	1999 %R	1999 n
	P. aeruginosa	78.95%	19	81.82%	22	86.36%	22	90.00%	10	96.15%	26	97.67%	43	100.00%	30
Trimethoprim/	***S. maltophilia***	12.50%	32	7.41%	27	3.45%	29	9.68%	31	16.28%	43	5.71%	35	4.55%	22
Sulfamethoxazole	***B. cepacia***	25.00%	4	14.29%	7	0.00%	8	0.00%	2	0.00%	4	0.00%	2	0.00%	2
	F. meningosepticum	-	-	50.00%	2	100.00%	1	0.00%	3	25.00%	8	0.00%	5	50.00%	4
	A. baumannii	-	-	-	-	66.67%	3	66.67%	3	78.57%	14	88.46%	26	86.67%	30
	A. calcoaceticus / anitratus	33.33%	3	66.67%	3	22.22%	9	100.00%	8	83.33%	6	68.75%	16	76.47%	34

n = Number of isolates tested for the specific antibiotic.